

Flight, May 20, 1911.

FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

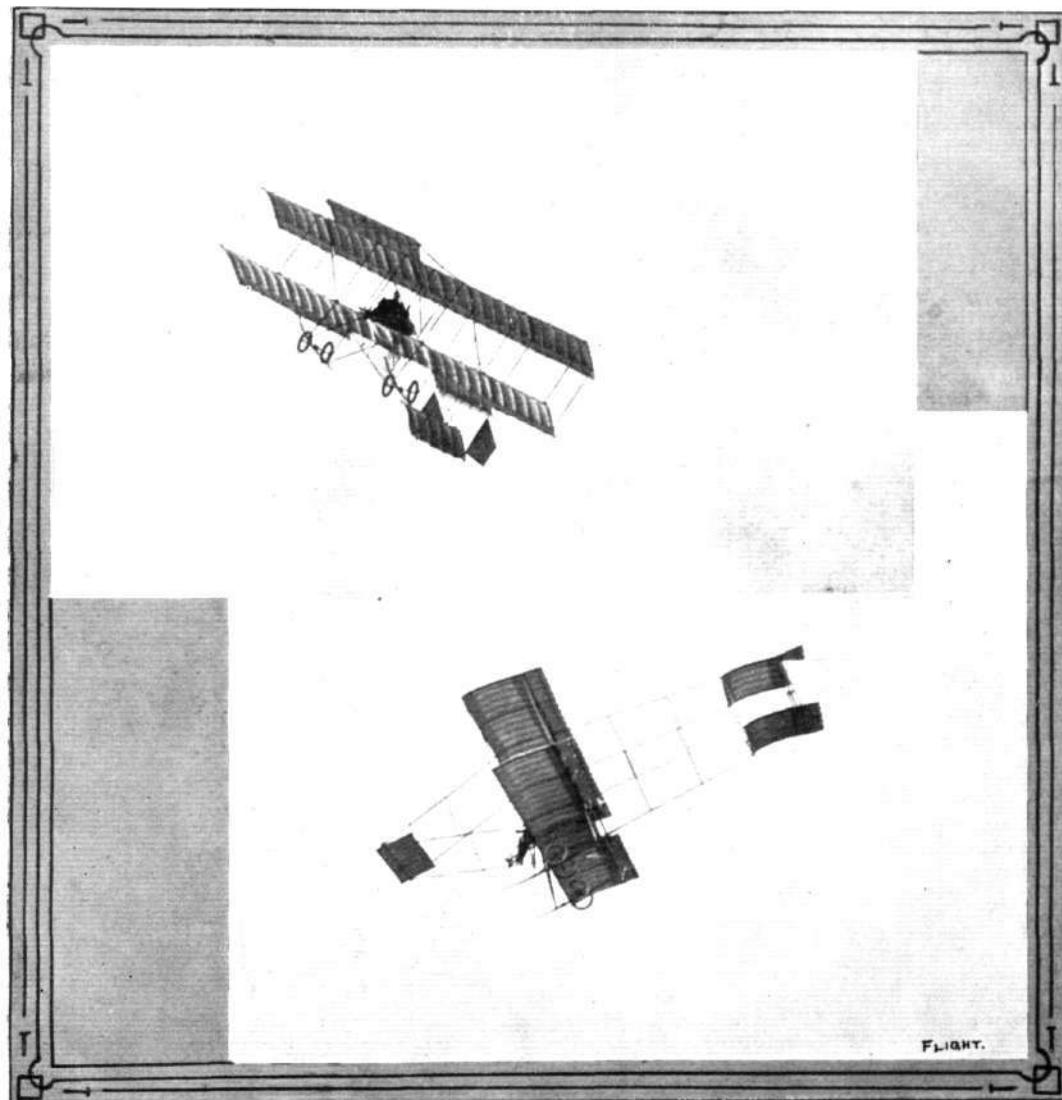
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THE GREAT HENDON DEMONSTRATION.—Two snaps of Grahame-White on his Henry Farman biplane when making a sharp turn and a *vol plane*. These photographs were taken with the camera held perfectly horizontal, so that the machine is seen at the angles at which the evolutions were actually carried out.

HENDON—AND AFTER.

In dealing with the events which took place at Hendon last week it is a little difficult to know what to say. On one hand the mere object lesson is enough without words from us—he is singularly obtuse who cannot read the lesson for himself—and on the other so much can be said upon the subject that it is hard to determine what to leave unsaid. And even then, so obvious are the deductions—particularly in view of our anticipatory leading article of a week ago—that all comment must almost of necessity be in the nature of platitude. To say that what took place on that historic Friday marks the apotheosis of the aeroplane from the standpoint of the British Army and Navy is a mere commonplace which the man in the street has realised for himself—but these are simply moralisings which carry no distance along the road we have to traverse.

We have said that the lessons are obvious, and, we think, with justification for the statement. But the Anglo-Saxon race is so conservative and cautious a people that even in the face of all that has happened head-shakings are to be observed and doubts are to be heard as to the utility of the aeroplane for the purposes for which the Hendon tests were designed to be a demonstration. And all because the weather conditions happened to be ideal! We say happened to be ideal advisedly, because even had those conditions been far less favourable the tests would have resulted just as they did. It is not with the aeroplane as an instrument of war that FLIGHT is principally concerned, although it is almost impossible, especially after this particular demonstration, to get away entirely from that aspect of its uses. Rather is it with the relatively indirect effect the Hendon demonstration is destined to have on the industrial development of the aeronautical movement generally. Designed as it was primarily to impress upon the official world the fact that the aeroplane as a factor in national defence has really arrived and must be seriously reckoned with in the future, it must also have impressed the public with a feeling that flight has really emerged yet a further marked stage from the embryonic condition and that it has already reached a state of development in which it can be made of vast practical service in the daily life of the community. Consider for a moment Hamel's flight to Aldershot and back. It was undertaken solely to demonstrate that the aeroplane may be usefully employed for the carrying of despatches in time of war. Now, the man in the street, to whom we have to look to make the industrial success of flying, already knew through the columns of his daily newspaper that this is a function of the aeroplane which hardly needed demonstration. It had been shown time and again that this is one of the spheres of usefulness in which the aeroplane is quite at home. But there was one aspect of Hamel's flight which must be deeply impressive to everyone who thinks at all seriously, and that is the fact that he actually and easily beat the telegraph in the matter of speed. Here indeed is something which is calculated to emphasise and drive home a correct impression of the new method of locomotion which can even now be depended upon to fetch and carry with certainty and which is withal faster even than the fastest of known methods of communication over considerable distances. A week ago even, people would have voted it a far cry to the aeroplane postal service, but now who knows what the effect of this single object-lesson may be.

Now let us consider another phase of things. It is not many weeks ago that we discussed in semi-serious manner

the possibility of the Prime Minister discarding his motor car in order to betake himself to the scene of his Parliamentary duties by aeroplane. At the time the prospect seemed so remote as almost to savour of the ludicrous. Not that we on our part could doubt the capacity of the dynamic flying machine even for that duty, but putting ourselves in the position of the ordinary observer the idea seemed sufficiently far-fetched for our immediate purpose at the moment. But within a few weeks the world has seen with its own eyes the Leader of His Majesty's Opposition and the First Lord of the Admiralty actually flying, and, what is more, taking the experience almost as a matter of course. Mr. Balfour's first venture into the realm of the air can hardly fail to produce a deep effect on the public mind. It is a demonstration of the safety of the new locomotion which is worth all the ordinary every-day flights imaginable, for it brings it home in a manner which could not have been achieved in any other way. The ex-Premier is a personality who appeals literally to everyone, no matter what particular shade of political opinion the individual may affect, and that he of all people in the Kingdom should adventure himself in flight must create a deep and lasting effect. Nothing could have been better from the point of view of those intimately connected with the movement than the sudden impulse which prompted Mr. Balfour to trust himself in the air. But was it a sudden impulse? We have it in mind that he was one of the earliest to discern the possibilities of the motor car and to accord it his patronage at a time when the *cache* of the highly-placed was of inestimable value to an infant and struggling industry; and it is more than possible that his first flight had at the back of it the desire to help this younger sister of the motor car. Whatever the prompting, we cannot allow the occasion to pass without recording our gratitude to the Rt. Hon. gentleman for this most helpful action and the influence it must undoubtedly exert on the minds of those who still think that the aeroplane is an instrument to be avoided by those who value a whole skin. It must surely force the reflection that if flying is safe for ex-Prime Ministers and members of the Cabinet, then it must be reasonably safe for the ordinary individual.

For the rest of it the lessons of Hendon are in the main military in their bearing, but all the same they are additionally valuable in that they must necessarily exercise a reflex action on the industrial side of the movement. It is not that we hold the doctrine that the State should take the place of the private inventor and the capitalist in the development of this or any other industry; but when it is shown that the State is intimately interested in the rapid progress of flight, in order that the country may keep abreast of her military rivals, then the State may reasonably be urged to give unstinted encouragement to those who are engaged in pioneering the home industry. After what has happened, it is impossible to doubt that this will be the case, and we look now for the early formulation of some such scheme of encouragement as that recently evolved by the French Minister of War, which has already been treated exhaustively in the pages of FLIGHT. Already it is known that both the Admiralty and the War Office have consented to receive deputations representing the Parliamentary Aerial Defence Committee, and that that body is intent upon asking, as Mr. Arthur Lee, M.P. put it at the close of the Hendon display, "what they are going to do about it?" We wonder!

For these negs see box: Hendon 1911.
Print 28-2-62 These negs were in box "Hendon 1913?", so some of
the others in this latter box may have been taken in 1911)

MAY 20, 1911.

FLIGHT

THE HENDON DEMONSTRATION.

OFFICIALDOM proverbially moves slowly, though many of those keenly associated with aviation and its progress have been apt from time to time to cry out against the want of appreciation by the British Government of the possibilities of the aeroplane. To be quite frank, and bearing in mind the extraordinarily rapid developments which have accompanied the progress of the art since the first practical flight was achieved about three years ago, it must be confessed that there has been under the circumstances a certain amount of justification on the part of those Government officials who have to regard all innovations from the broadest possible point of view. We, of course, could have wished a long time ago that the infinite possibilities and importance of the aeroplane had at once been taken advantage of by British authorities, but provided any slackness in this respect is now made up for there will be little to complain about in the long run. No excuse, after the remarkable demonstration at Hendon last week, can any longer exist for extensive plans not being laid for taking advantage of the present advanced stage of flying, however crude that stage may be if compared with developments which may in time to come be made.

That the best of the official world, not only political, but the Army and the Navy, witnessed on Friday of last week such an ocular demonstration of the extraordinary value and mobility of



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The Rt. Hon. A. J. Balfour after his "air baptism" with Mr. Grahame-White at the Hendon Demonstration. "Is flying all right?" "Rather!!"

the aeroplane, and were duly impressed by the practical value of such machines, is a conclusion to which almost every visitor to the Hendon aerodrome毫不犹豫地 arrived. Strolling amongst the remarkable gathering were Royal visitors, members of both the Cabinet and the Opposition, and highly placed Army and Navy officers. On all sides there was but one note of conversation, and that was admiration and astonishment at the things which were being done. Many who had no doubt gone inclined to sneer remained to be amongst the most enthusiastic supporters, in the future, of the new art. About the most adverse form of criticism that any Army expert could advance, and then only in a mild form, was that whilst bombs and other little attentions of that sort were being dropped either on to battlefields or regiments of soldiers the flying men would be incidentally annihilated by the fire of their victims, as most of the attacks of this character were at such a height that the flying men were no doubt well within range of a smart marksman. After all, this weakness is one that there should not be the slightest difficulty in remedying.

The feats of bomb throwing and the dropping of heavy weights by Mr. Grahame-White were more to demonstrate the possibilities of such action, without any ill effects to the flying man, and from this point of view the evolutions were superlatively successful. Skill would come with practice, and the same



AT THE HENDON DEMONSTRATION.—Lord Lansdowne meets the Duke of Connaught and Prince Arthur Connaught. On the left is Mr. Grahame-White.

Hendon 1911



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Sir Rufus Isaacs and Mr. Lloyd George taking note of one of Grahame-White's specially daring feats.

results could unquestionably be obtained from heights of such range as to be well out of reasonable danger from below, and once the need is established, mechanical instruments of the greatest precision for directing the discharge of bombs and missiles of different characters would within a very short period be evolved, which would undoubtedly be equal to any requirements of the military flyers.

That good to the industry must result from this national gathering is practically a foregone conclusion, as the Parliamentary Aerial Defence Committee—with Mr. Arthur Lee, M.P., at its head, and Mr. Arthur Du Cros, M.P., as its indefatigable hon. secretary—is hammering it home in the proper quarters. The practical work done

must bring about important action amongst those who were eyewitnesses of the remarkable experiments organised for their edification.

It can hardly be otherwise than that every visitor that day is for the future a friend of aviation, and the importance of that friendship can best be realised from the fact that there were present at this demonstration, organised by the Parliamentary Aerial Defence Committee, besides some 300 Members of Parliament and some hundreds of Army and Navy officers, the Duke and Duchess of Connaught, Prince Arthur of Connaught, members of the Cabinet and Opposition, including Mr. Asquith, Mr. Balfour, Mr. Lloyd George, Mr. McKenna, the First Lord of the Admiralty, Mr. Winston Churchill, Sir Rufus Isaacs, Sir Herbert Samuel, the Postmaster General, Lord Lansdowne, Colonel Seely—in fact practically every Minister who was not in duty attendance upon King George during his official visit to the Crystal Palace. Other notable attendances were Lord Northcliffe, Lord Charles Beresford, Lord Roberts, the Lord Chief Justice, Lord Rothschild, Lord Fisher, Sir Ernest Shackleton, Sir Philip Watts, Lord Denman, Mr. Gerald Balfour and Mr. Burdett-Coutts.

Proceedings opened well in advance of the official programme time, as Lord Haldane was already on the ground by half-past two. For his edification a number of preliminary tests were forthwith indulged in. Mr. Grahame-White brought out his Henry Farman biplane and opened the ball by dropping "bombs" on to a ground target representing the deck of a battleship, coming each time within about 2 feet of the bullseye. Equal success attended him with a 100 lb. bag of sand. After travelling round the aerodrome at a good speed with this hanging below, and rising to a reasonable height, at the proper moment by a special catch this bag was released for its mark, and struck home with a dull thud which could be heard all round the aerodrome. What may appear to many to be remarkable in this, besides the hitting of the mark, was that the release of the 100 lb. weight failed to alter the course of the biplane in the least. And then with his elevator down, Grahame-White swooped towards the ground, to rise again with a splendid upward curve for a circuit of the aerodrome before coming gracefully, within a few feet of the enclosure, to earth.

Soon after three the word went round that Mr. A. J. Balfour was to take a trip with Mr. Grahame-White, and within a few minutes it was a fact accomplished. Starting away at a quarter-past three, hatless, with his silver hair gleaming in the brilliant sun, this very distinguished passenger was sped round the aerodrome for a couple of circuits. Then came a run along the ground with the wheels just grazing the grass, to rise again before alighting. Naturally, there was somewhat of a rush to ascertain Mr. Balfour's views upon his experience, but those who were near required no words from the Leader of the Opposition. His smile and his face were too expressive

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The Rt. Hon. A. J. Balfour gives a vivid description of his flight with Grahame-White to Lord Haldane, which Grahame-White (on the left) enjoys.

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Lord Roberts and Lord Charles Beresford comparing points upon the great demonstration.

Hendon 1911 Box



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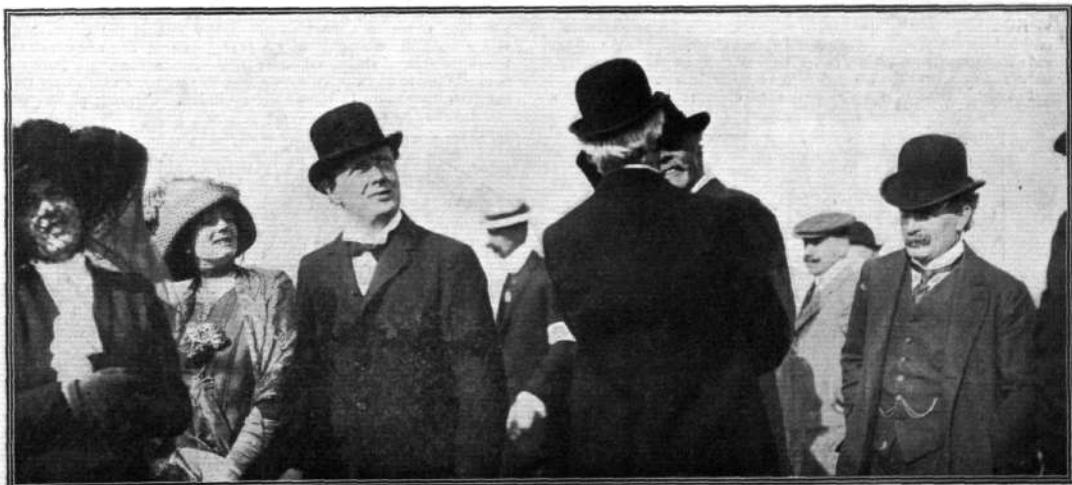
A swoop down across the enclosures and machines from over the hangars by Grahame-White at the Hendon Demonstration last week during one of his exhibition flights. From this it will be seen how close down it is possible with perfect safety to steer.

to leave any doubt as to the enjoyment which he had experienced. Although a set programme was issued, it was not strictly adhered to in its order of carrying out, but event followed event without break, and by 3.40 Hamel had started away on his Blériot monoplane for the despatch-carrying and reliability test across country to Aldershot. Rising rapidly, he was fully 1,000 feet up by the time he had circled the aerodrome, and passed away direct over the hangars for his destination. Carrying with him, besides an official War Office document, a special batch of an "aeroplane edition" of the *Pall Mall Gazette*, in which had been printed the doings up to that time at Hendon, he made a bee-line without the smallest deviation across country to Farnborough, arriving there at 4.20 p.m., having therefore occupied only a matter of 40 mins. for his 35 miles' trip. So successful was his flight that he was quite unexpected at such an early period of the afternoon at Farnborough, and he consequently was delayed there fully three-quarters of an hour before he was able to have his "despatches" received, vouchéd for, and a fresh batch of *Pall Mall Gazette* "aeroplane editions," by way of return despatches, strapped behind him on his machine. In similar manner to that on those he had brought, Hamel's arrival at Aldershot was duly recorded in this special edition, he being his own carrier of the news. The exact time of returning from Farnborough for Hendon was 5.5 p.m. By a few minutes past 5.30 a shout passed along the occupants of the enclosures that Hamel was sighted on his return from Aldershot. He steered across the hangars at a height approaching

some 3,000 feet, and with a splendid spiral *vol plané*, came down within a hundred yards of the front of the enclosures, landing at 5.35, his return journey having thus occupied some ten minutes less than the outward trip. His arrival was the signal for a burst of applause, and he was personally congratulated by the Duke of Connaught upon his achievement, the copies of the *Pall Mall Gazette* which he had brought being copied by Mr. Grahame-White to the Duke, Mr. Asquith, Mr. Balfour, and a number of other distinguished visitors who were in the immediate vicinity.

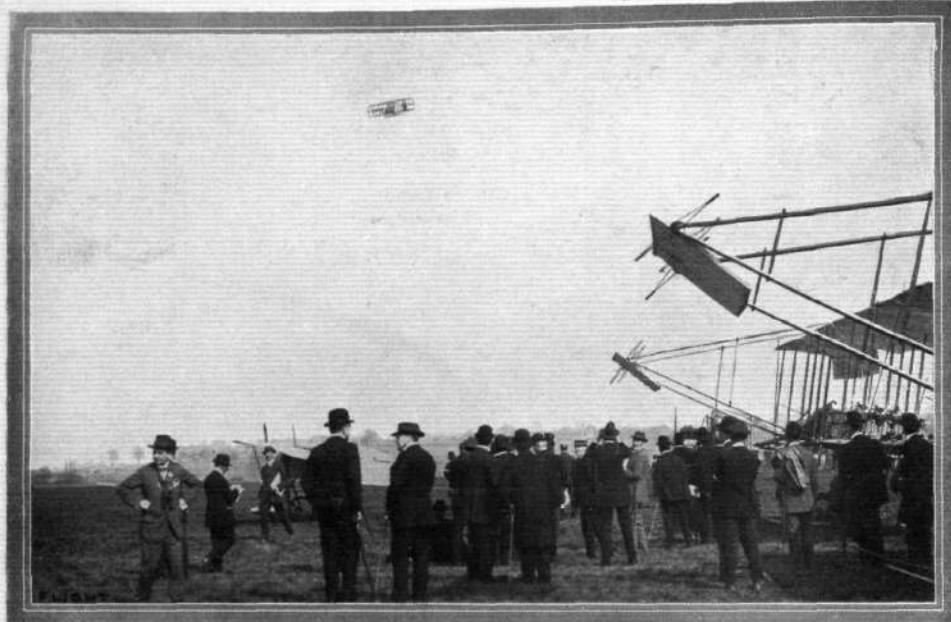
Incidentally Hamel beat the telegraph, as a wire which was despatched at the same moment as Mr. Hamel's departure arrived some 15 minutes or more after him at Aldershot, the telegram from Aldershot arriving at Hendon 30 minutes after Hamel.

During the carrying out of this very convincing test, things were not idle at the aerodrome. Mr. Armstrong Drexel, who within 30 seconds of the start of Hamel also rose on another Blériot for the purpose of accompanying Hamel to Aldershot, was speedily brought to earth again with a nasty crash, owing to the carelessness of a mechanic, who had crossed the wires manipulating the elevating plane. Truly this was bad luck, and the greatest sympathy was expressed with Mr. Drexel under the circumstances, although fortunately he himself escaped with nothing worse than a shaking. Just prior to the start of Hamel for Aldershot Mr. S. F. Cody was seen approaching at a height of about 1,000 ft. on his journey across from Brooklands. At that height this great biplane



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THE GOVERNMENT AND THE OPPOSITION AT THE HENDON DEMONSTRATION.—Mr. Lloyd George, Mr. and Mrs. Winston Churchill, Mr. A. J. Balfour and his brother watching the flights.



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Mr. S. F. Cody arrives from Brooklands on his biplane for the Hendon Demonstration.—His fine *vol plane* to the demonstration grounds.

looked as graceful as the skimming monoplanes, and before his machine had reached the limits of the aerodrome he had shut off his engine, and from that point he made a beautifully slow and impressive *vol plane* completely round the aerodrome, getting down close to earth in parallel line to the enclosures. Then, after just touching earth, he rose again, this time steering to the right and completing a fine figure of eight before finally coming to rest within a few feet of the central enclosure. Hamel and Drexel in the meantime, pending the finish of Cody's cross-country flight, had stopped their engines so as not to interfere with Cody's *pas seul*.

Ten minutes later, Greswell on a Blériot got away for a spin round the aerodrome, followed almost immediately by Pixton on the Avro, which had also arrived by way of the air from Brooklands earlier in the day. These flights were in connection with the item for rising and alighting quickly, in which also Mr. Loraine took part on his Howard Wright biplane. An excellent flight followed the get off of the Avro machine, Mr. Pixton finishing up with a splendid *vol plane* from over the hangars across the enclosures.

From this time events followed each other rapidly, including a

speed comparison test between monoplane and biplane, erecting and dismantling a Blériot for the purposes of transport for Army work, bomb throwing and heavy missile dropping, machine gun and ammunition carrying, and reconnaissance test with officers as observers. Never for a moment was the air free of one or two machines, circling round at varying heights, and indulging in *vol planes* and quick turns. As to Mr. Grahame-White himself, his evolutions must have been positive revelations to those who had never had a favourable opportunity of witnessing what could be done by a skilful pilot with an efficient machine. However much, for many reasons, one might deprecate the complete wisdom of the manoeuvre, there were, without doubt, some splendid and effective evolutions made immediately over the enclosures packed with people. Rising at times rapidly to considerable heights, then swooping down to almost within a few feet of the earth, Mr. Grahame-White was again with a graceful curve well away over to the other side of the aerodrome; then with a turn, his Farman banked over to an extraordinary angle, he was back again over the hangars, once more to repeat the evolution. Carrying passengers



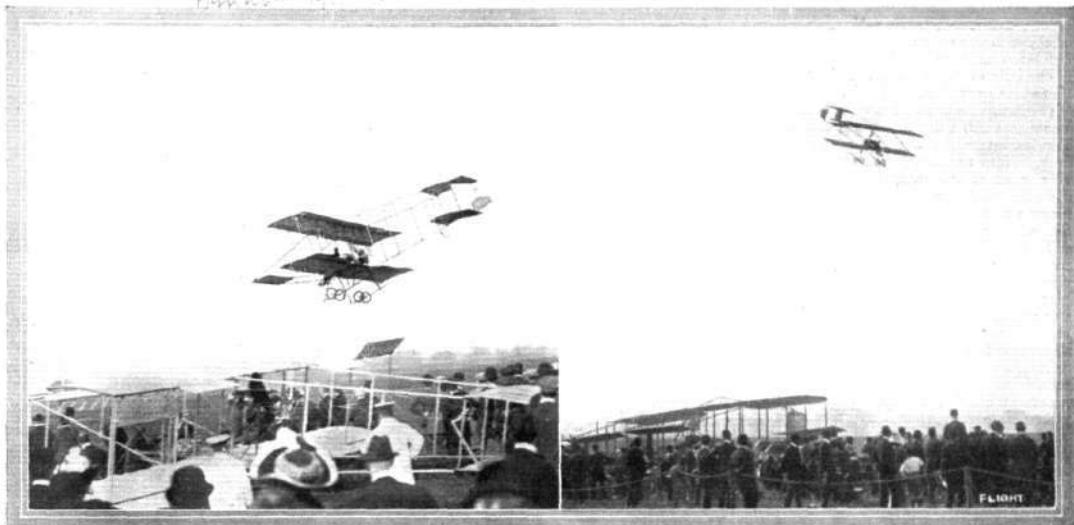
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Mr. S. F. Cody finishing his flight from Brooklands to Hendon.

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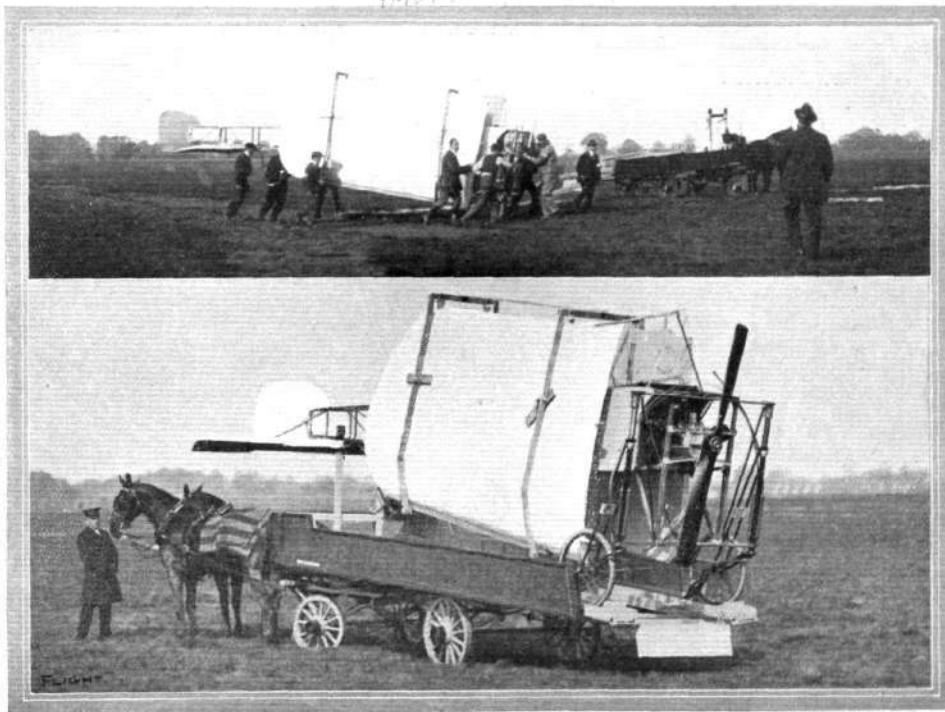
Hendon 10



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A couple of *vol planés* by Grahame-White on his Henry Farman at the Hendon Demonstration last week.—In the left-hand photograph Mr. McKenna is flying as passenger with Mr. Grahame-White.

Hendon 10



Hendon 10 11

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ERECTING AND DISMANTLING TEST.—The Blériot military monoplane with which this item of the programme was carried out at the Hendon Demonstration. Below, the Blériot on its transport wagon; and above, immediately after the order for erection had been issued.

made no difference to him. One after another were taken up, including Mr. McKenna and Lord Denman. At intervals other excellent flights were made by Mr. Compton Paterson, Mr. Greswell, and Mr. Pixton on the Avro.

The item of assembling a Blériot monoplane and dismantling it afterwards proved particularly interesting to a number of members of the Army Council. It gave the lie direct to the ridiculous statements that half a day or more is required to put machines together. The Blériot, which was packed away on its transport wagon, was brought into the aerodrome, and at the word to assemble, within nine minutes the machine was ready for flight. The reverse operation was then started and by 11 mins. 5 secs. the whole monoplane was packed securely on its transport wagon and ready for following any regiment that might require to be moving away.

Towards the evening reconnoitring tests were carried out. These proved of very convincing value. Mr. Hubert took up with him as observer Captain Sykes, a map of the surrounding country being placed conveniently on the machine. Mr. Compton Paterson carried Major Evelyn Wood, D.S.O. Both of these scouts rose rapidly into the calm air and were soon lost to sight. It had been so arranged that previous to the start of the scouts a battalion of infantry, representing the enemy's troops, as also two squadrons of cavalry and a battery of artillery had disposed themselves at various points of cover within a specified area, entirely unknown to the pilots or their observers, the ground selected being between the aerodrome and St. Albans, about thirteen miles away. This reconnoitring test was carried out under the supervision of Gen. Murray, of the War Office, and in both cases the observations made by the officers and the pilots were of a most convincing and successful

THE NAVAL AIRSHIP STILL IN DOCK.

FURTHER delay in the launch of the Naval dirigible was occasioned last week by one of the crew falling on to and damaging some of the framework. The man, able-seaman Palmer, was

character. After rising well over 3,000 ft., they passed away towards the country where the enemy had been reported as lying, and without any difficulty they were able to locate the infantry and duly recorded it upon their maps, whilst the enemy's artillery were also observed and reported. At the height at which these observations were carried out there was no reasonable possibility of any marksman being able, with present gunnery, to interfere effectively with their movements.

After this flights still continued, passengers were carried, and presently Mr. Cody on his big biplane, after an exhibition flight round the aerodrome, took his departure for Aldershot, while those who remained, still hopeful of receiving their air baptism at the last moment, found night creeping on too rapidly to carry much hope of their wishes being consummated. And so finished one of the most impressive demonstrations that could possibly have been devised for the bringing home, not only to officials of the Government, but to the entire British public, the marvellous strides which, in the short period of about three years, have been made in aviation.

One little fly in the ointment was the want of permission given for Mr. Barber to demonstrate the qualities of his British-built Valkyrie machines. Probably no man in England has more consistently carried out practical experiments for the past two or three years than Mr. Barber of the Aeronautical Syndicate, and we can only assume that his name and machines not being included as a set item in the programme was due to some misunderstanding. His Valkyrie machines are not only British-built but have the great merit of being very original in design and a considerable departure from ordinary accepted practice in many details of construction.



THE NAVAL AIRSHIP STILL IN DOCK.

slightly injured about the head, and was taken to Barrow Hospital. The damage to the airship was quickly repaired, but up to Wednesday evening the airship remained in the shed.



THE NEW NAVAL AIRSHIP CONSTRUCTED BY MESSRS. VICKERS, LTD., AT BARROW.—Preparations for launching. Capt. Sueter drilling seamen and marines selected to man the dirigible. The marines are being instructed in towing from the shore and steadying the airship when brought out. Note the sail-cloth "door" is seen drawn, and the airship is visible in its shed.

THE HENRY FARMAN MONOPLANE.

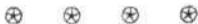
ALTHOUGH the name of Farman is inseparably associated with biplanes, readers of *FLIGHT* are aware that Mr. Farman has been for some time successfully experimenting with a monoplane of his

engine that drives the propeller. Also, as may be observed, the entire rectangular girder frame constituting the body is covered with surfacing material. At its rearmost extremity is the cruciform



own design. We are now able to give the accompanying photograph of the machine in question. Perhaps the most striking feature of the external appearance of the machine is the neat casing that completely encloses the 50-h.p. Gnome rotary air-cooled

tail comprising an elevator and rudder. In the trailing extremities of the main wings are hinged balancing planes. The span of the machine is 9 metres (nearly 30 ft.) and the overall length 8.5 metres (28 ft.). The supporting area is 17 sq. metres (about 183 sq. ft.).



THE LATEST FARMAN BIPLANE.

THE accompanying photograph shows the latest Farman military biplane, of the successful experiments with which readers of *FLIGHT* have already heard. The first and most noticeable point to be observed is, of course, the absence of the front elevator. In this machine

observed that the two rudder planes are in line with the elevator so that the fixed tail plane is wholly in advance of all the movable members. This machine has the extended upper main plane characteristic of the Farman military type, and the method of



fore and aft equilibrium is obtained entirely by the use of a tail elevator, which forms a hinged extension on the horizontal tail plane. It will also be noticed that this elevating plane is of fairly high aspect ratio as also are the balancing planes in the trailing edges of the upper main planes. The tail as a whole and the tail outrigger have a light workmanlike appearance and it may also be

trussing the upper front spar, by wires passing over steel brackets forming extensions of the outermost struts, forms an interesting minor detail relating thereto. The machine is fitted with a Gnome rotary engine. In the above photograph Mr. Farman is seen talking to Lieutenant Menard, one of the foremost biplane pilots of the French Army.

BRITISH NOTES OF THE WEEK.

The Gordon-Bennett Race and Other Matters.

SEVERAL interesting announcements appear in the Royal Aero Club Official Notices of the current week. These include a strong notice forbidding flights over Coronation Processions, and also an appeal from the Jockey Club to aviators to refrain from flying over racecourses during the meetings in view of the effect which it has upon the horses.

The venue of the Gordon-Bennett Race is also announced to be at the Club's flying grounds at Eastchurch, Isle of Sheppey, the date being, as already notified, July 1st.

Kaiser Welcomed by Aeroplanes.

ONE of the first sights which greeted the German Emperor as the Imperial yacht "Hohenzollern" neared Sheerness was a couple of aeroplanes piloted by two of the naval officers who have undergone their training at Eastchurch. They did not approach very close to the Imperial yacht, but were near enough to be clearly observed.

Monoplanes Destroyed by Fire.

BY the fire which broke out mysteriously at the London Aviation Ground, North Ealing, on Sunday evening, five monoplanes of various types were destroyed. The outbreak extended to four sheds, and owing to the rapidity with which the flames spread it was practically impossible to save the contents. Two machines were hauled to a place of safety by the police.

Whitsun Meeting for Pwllheli.

AMONG the watering places which are endeavouring to arrange for flying exhibitions as a special attraction on Whit-Monday is Pwllheli. As there has been so little flying in Wales hitherto, it is felt that if such a series of flights can be carried out they would draw a large crowd to this North Wales seaside resort.

Portsmouth to Brighton by Aeroplane.

AFTER being weatherbound at Portsmouth for a couple of days last week, Mr. Graham Gilmour flew back to Shoreham on the 11th inst. The voyage was made practically without incident, his Bristol biplane behaving splendidly throughout the trip.

Flying Through a Thunderstorm.

WHILE delivering a Bristol biplane by way of the air to Mr. Morison at Brighton, Mr. Collyns Pizey, of the British and Colonial Aeroplane Co., had a thrilling experience. He rose from Salisbury Plain on a new Bristol military biplane late on Thursday afternoon, and had not gone far when a thunderstorm which had been threatening for some time broke in all its fury. Afterwards Mr. Pizey said that he then had what was probably the most awe-

inspiring quarter of an hour ever experienced by an airman. Lightning played about the machine almost like flames, and the noise of the thunder was deafening. Owing to the dense rain, the pilot was unable to see the earth for some time, but he eventually effected a landing to the east of Portsmouth, where he anchored for the night. Early the next morning he was able to resume his journey, and duly delivered the new Bristol to Mr. Morison. It was the aviator's first long cross-country flight, and the experience will undoubtedly live long in his memory.

The Aeroplane Race at Brighton.

ON Saturday last it was found possible to carry out the postponed aeroplane race between Mr. O. C. Morison and Mr. Graham Gilmour, both on Bristol biplanes, from the Shoreham Aerodrome to the Black Rock, Brighton, a distance of about seven miles. At starting, Mr. Gilmour took the outside berth, flying out to sea and very high, while Mr. Morison made a straight dash for the winning post and kept fairly low. These tactics paid, and Mr. Morison was awarded the race by about 10 secs. Both aviators landed in the grounds of Roedean Ladies' College, but Mr. Morison had the misfortune to slightly damage a skid through coming into contact with a wire fence. Mr. Gilmour returned to Brighton the same afternoon, but Mr. Morison waited until the next day when, although he had to fight his way against a head wind, he successfully made the journey to Shoreham.

Flying at Brooklands Race Meeting.

ALTHOUGH at one time it appeared as though there would be no flying on the occasion of the motor car race meeting at Brooklands on Wednesday of last week, owing to a strike of airmen, this trouble was averted by the aviators withdrawing their letter and agreeing to meet at a round table conference. Unfortunately a stiffish breeze persisted in blowing during the afternoon, and this kept most of the aviators inside the sheds. Mr. Graham Gilmour, however, brought out his Bristol biplane and made two short flights, being up for 16 mins. 49 secs. altogether, while Mr. H. Pixton on the Avro biplane made one trip of 21 mins. 29 secs., and another of 18 mins. 48 secs. This aggregate of 40 mins. 17 secs. was sufficient to win for him the first prize of £30 or a cup, while Mr. Gilmour took the second prize of £15 or a cup. In view of the trouble with the aviators arrangements had been made by the Brooklands Executive with Mr. S. F. Cody to fly from Aldershot to Brooklands. The breezy conditions made it impossible for the journey to be undertaken until late in the afternoon, but at half-past five Mr. Cody arrived, having taken 23 minutes to fly over from Laffan's Plain. According to his barograph the greatest altitude had been 2,312 ft. Soon after his arrival he made a trip of about half-an-hour's duration over the aerodrome.



IN THE WAR OFFICE AND PARLIAMENTARY ENCLOSURE AT THE HENDON DEMONSTRATION.

In the distance, on the left of the photograph, is Mr. Armstrong Drexel's monoplane just

Ante-Breakfast Trial Trips.

URTHER details are now to hand regarding the cross-country flights made by Mr. G. Higginbotham, of Macclesfield, at Freshfield on Saturday week. At 7.30 a.m. Mr. Higginbotham, on his British-built biplane, set out from Freshfield and flew to Southport and back. After a few minutes rest he was in the air again and was away again over to Waterloo in order to pay a visit to Mr. Melly at his school there. Mr. Melly was out, however, so after leaving a card Mr. Higginbotham returned to Freshfield and then once more made the round trip to Southport and back. Each of the three trips was of about 16 miles round, and so the total distance flown was roughly 48 miles. In the afternoon Mr. Higginbotham again went over to Southport and back, and then made several short flights of about six or seven minutes with figures of eight. He finished up by taking Mr. Fenwick for a trip of about 10 miles, going out over the sea for about a mile.

Folkestone and Cross-Channel Prize.

IN connection with the proposed cross-Channel competition between Folkestone and Boulogne, a sum of £563 has been obtained in Folkestone towards the £1,000 which was asked for to be offered in prizes, &c., and the Aerial League has been asked if this sum will be accepted by the Council.

Mr. Prier Joins the "Bristol."

MR. PIERRE PRIER, the hero of the London to Paris flight, has joined the staff of the British and Colonial Aeroplane Co., of Bristol, and will in future fly their machines exclusively.

Mr. Sopwith has a Mishap.

WHILE flying with a passenger on his Blériot monoplane at Mineola, Florida, on the 11th inst., Mr. T. Sopwith is reported as having met with a mishap, falling from a height of about 50 ft. Fortunately Mr. Sopwith escaped with nothing worse than a few cuts and bruises, but the machine was seriously damaged. Earlier in the day he had made several half-hour flights with passengers.

The Southfields Balloon Adventure.

CAPT. B. H. BARRINGTON KENNETT writes us that the gas-valve was not to blame for the sudden descent, as recorded last week. The balloonists were forced to come down owing to their ballast having run out, and as there was practically no wind at all a descent into the streets was unavoidable. Capt. Barrington Kennett was piloting the balloon, and after trying various altitudes eventually obtained an equilibrium at 7,500 ft. for 50 minutes, a fact which proves conclusively that the valve was not in a defective condition.

Testing an E.N.V. Engine.

IF there is one thing that brings joy to the heart of the engineer it is, that having designed and built an engine it should at its first turn start off and run without a falter. Such an experience was obtained the other day at the E.N.V. Motor Works at Willesden, when the first of the new 8-cyl. 100-h.p. engines was placed upon the test bench. After being fitted with a fan dynamometer, one of

the mechanics pulled the engine round in orthodox style, and the engine started off at once and ran for a considerable time at full power, her smooth and steady work being very impressive to the watchers. A noticeable feature of the test was that not the slightest vibration was perceptible. Both for dirigible and for hydroplane work, this engine should have a good future before it, and we understand that inquiries are being received from all parts of the world.

MORE FRENCH PILOTS.

A FURTHER batch of certificated pilots by the Aero Club of France are given below, bringing the numbers up to 439.

Name.	Country.	Date of Birth.	Where Born.	Machine	Qualified.	No.
Balencie, Henri	Fr.	25 Ap., 76	Lahitte Toupiere	M. Far.	3 Ma., 11	425
Bon, Paul Celestin	Fr.	30 No., 76	Paris	Caud.	"	432
Bontony, Etienne de	Fr.	30 De., 86	Geneva	Ant.	"	403
Braun, Robert	Fr.	8 Fe., 74	Paris	Bl.	"	407
Bruel, Leon	Fr.	31 Jy., 88	Amand	H. Far.	"	426
Camine, Victor Alex.	Fr.	21 Jy., 79	Aix les Bains	Ant.	"	427
Caribelli, Charles Louis	Fr.	21 Se., 86	Neuchateau	Vois.	"	406
Casse, Gilbert	Fr.	20 Ma., 79	Buenos Ayres	H. Far.	"	415
Castries, Jacques de	Fr.	29 Jy., 68	La Norville	Han.	"	439
Caudron, Gaston	Fr.	18 Ja., 82	Favieres	Caud.	"	434
Chemine, Ernest	Fr.	29 Jy., 79	Nantes	Han.	"	426
Copin, Georges	Fr.	12 De., 88	Puteaux	Copin	"	437
Derome, Marie Alph. P.	Fr.	3 My., 77	Paris	M. Far.	"	435
Dubreuil, Gaston	Fr.	13 Fe., 83	Paris	Han.	"	423
Filius, Albert	Fr.	25 Se., 83	Garchio	Bl.	"	420
Foin, Andre	Fr.	27 No., 85	Paris	Bl.	"	416
Fourny, Alex.	Fr.	23 Ju., 84	Chauvency	H. Far.	"	418
Foye, Fernand	Fr.	9 My., 90	Paris	Bl.	"	411
Franceson, Em. Andre	Fr.	7 Aug., 75	Genolhac	Vois.	"	410
Garnier, Gustave	Fr.	1 Fe., 77	Paris	Breit.	"	424
Lafargue, de	Fr.	17 Au., 80	Marman	H. Far.	"	417
Lambert, Auguste	Fr.	16 Fe., 78	La Neuve Lyre	Pis.	"	439
Landron, Pierre	Fr.	13 D., 78	Paris	Pis.	"	419
Laparte de St. Sernin, J. E. O.	Fr.	14 Oct., 87	Toulouse	H. Far.	"	412
Lecomte, Sadi	Fr.	1 Jy., 91	Orteigman-s.	Bl.	"	431
Legrand, Aristide	Fr.	23 No., 80	Paris	Breg.	"	414
Lhourneau, F. Andre	Fr.	9 Fe., 93	Clussais	—	"	421
Mallard, Arnaud	Fr.	3 Ma., 81	Fouquebrune	H. Far.	"	423
Mathieu, Louis L. R.	Fr.	2 Ju., 87	Paris	H. Far.	"	420
Meunier, Pierre M.	Fr.	11 Au., 88	Fliers	M. Far.	"	405
Olivier, Henri	Fr.	8 Ju., 83	Neuilly	Han.	"	439
Parent, Hippolyte	Fr.	13 De., 85	Oullins	Han.	"	422
Pchanovsky, Basile	Ru.	1 Ja., 82	Odessa	Bl.	"	407
Peraldi, Joseph Leon	Fr.	21 Ja., 79	Port Villey	Breg.	"	428
Rey, Leon	Fr.	27 No., 79	Amnonay	Han.	"	438
Schneider, Jacques	Fr.	25 Ja., 79	Paris	Bl.	"	409
Tretarre, Roger	Fr.	26 Au., 82	Blous	Vois.	"	408
Woodward, George E. J.	Brit.	14 Oct., 80	Tunno	H. Far.	"	404
Wyss, Paul	Sw.	1 Ma., 82	Geneva	Bl.	"	402

Country—Brit. = Great Britain; Fr. = France; Ru. = Russia; Sw. = Switzerland.

Maching.—Ant. = Antoinette; Bl. = Blériot; Breg. = Breguet; Caud. = Caudron; Han. = Hanriot; H. Far. = Henry Farman; M. Far. = Maurice Farman; Pis. = Pischoff; Vois. = Voisin.



ION LAST WEEK, SHOWING ALL THE MACHINES IN LINE IN FRONT OF THE HANGARS.—
t had come to grief owing to a mechanic having wrongly crossed the wires of the elevating plane.



The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday, the 16th inst., when there were present:—Mr. R. W. Wallace, K.C., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Col. H. C. L. Holden, R.A., F.R.S., Prof. A. K. Huntington, Mr. Mervyn O'Gorman, Mr. C. F. Pollock, and H. E. Perrin, Secretary.

New Members.—The following new members were elected:—E. V. B. Fisher, Major Mordaunt John Fortescue FitzGerald, R.F.A., Stuart A. Hirst, Peter Arthur Carlaw Walker, Evelyn C. B. Wilbraham.

Aviators' Certificates.—The following Aviators' Certificates were granted:—

- 86. J. L. Travers, Junr.
- 87. Edward Hotchkiss.
- 88. Capt. T. C. R. Higgins.

Flights over Coronation Processions.

It has been suggested to the Committee of the Royal Aero Club that some aviators may contemplate flying over the Royal Processions during the Coronation celebrations. In the opinion of the Committee such flights would not only be dangerous but also lacking in good taste. In order, therefore, to prevent any misunderstanding, the Committee wishes to give public notice that in the event of any such flights taking place the certificate of the aviator will be suspended.

Flights Over Racetracks.

The Jockey Club, through Lord Lonsdale, has written to the Royal Aero Club drawing attention to the disturbing effect on the horses caused by aviators flying over racetracks during the race meetings, and asking the Club to appeal to all aviators to refrain from making such flights. In the interests of aviation the Committee of the Royal Aero Club accordingly appeals to the sporting instincts of all aviators to support this very proper and reasonable request, which has the Committee's full approbation.

Gordon-Bennett Aviation Race.

The Committee of the Royal Aero Club has had under consideration for some months past the venue for the Gordon-Bennett Aviation Race, and, having inspected a large number of grounds, has now definitely decided to hold the race at Eastchurch, Isle of Sheppey. The rules stipulate for a minimum circuit of 3 miles 1 furlong, and, with the exception of Eastchurch, none of the grounds put forward can provide this distance free of obstacles. The race will take place on Saturday, July 1st, and the following countries will be represented:—America, Austria, France, Germany, Great Britain.

Special railway and catering arrangements will be made for the convenience of the public.

"Daily Mail" Second £10,000 Prize.

Intending competitors are reminded that the entries for this contest close at 12 noon on June 1st, 1911. The entrance fee is £100, payable in one sum or as follows:—

£25 by 12 noon on June 1st; £75 by 12 noon on July 1st.

Late entries will be received up to 12 noon, July 1st, 1911, in which case the entry fee will be £200.

Copies of the rules and entry form can be obtained from the Secretary, Royal Aero Club, 166, Piccadilly, London, W.



PROGRESS OF FLIGHT

Aero Models Association (CAXTON HOUSE, WESTMINSTER).

A very successful model flying competition was carried out by the North Metropolitan Branch of the Aero Models Association on their flying ground at Bishop's Avenue, East Finchley, on Saturday, May 13th. Messrs. A. C. Horth (chairman of the Association), F. B. Beringer, H. Brosse, C. Edwards, and M. B. Ross (hon. secretary of the Branch) acted as judges, and their awards are as follows:—

Class I.—For Longest Direct Flight.—1st, E. W. Twining, 348 ft.; 2nd, R. F. Mann, 272 ft. 10 ins.; 3rd, H. D. Murray, 236 ft. For Point to Point Contest.—1st, E. K. Brown, 15 flights.

Class II.—For Longest Total Direct Flight.—1st, A. W. Cunningham, 464 ft. 5 ins.; 2nd, E. W. Twining, 447 ft. 5 ins.; 3rd, C. E. E. Smith, 418 ft. For Point to Point Contest.—1st, C. E. E. Smith, 14 flights.

The officials of the Club left London on Friday for the purpose of visiting the towns of Harrogate, Newcastle, Edinburgh, Stirling, and Glasgow. The various arrangements made in these towns will be announced later.

The Manville £500 Prize.

The third date for this competition is on Saturday, May 20th. The only flight so far recorded is by C. Howard Pixton at Brooklands, 31 minutes, on May 6th, 1911.

European Circuit.

The Royal Aero Club has approved of Hampden Park, Eastbourne, as one of the alighting places in England for the European Circuit.

Aviators' Certificates. Instructions to Observers.

Observers shall only allow flights for aviators' certificates to be made when the course is clear.

Observers are requested to report fully on the flights, with particular reference as to the method of alighting (see Rule 5).

Legislative Committee.

The three aeronautical bodies have nominated the following members to form a Legislative Committee to advise and assist the Parliamentary Aerial Defence Committee:—

Royal Aero Club.—C. Grahame-White, Sir Charles D. Rose, Bart., M.P., and R. W. Wallace, K.C.

Aeronautical Society.—Griffith Brewer, J. W. Dunne, and Lord Montagu.

Aerial League of the British Empire.—Three representatives to be nominated.

Royal Aero Club Legislative Committee.

The following have been appointed:—C. Grahame-White, C. F. Pollock, Sir Charles D. Rose, Bart., M.P., and R. W. Wallace, K.C.

"Point-to-Point" Balloon Race at Hurlingham.

The Point-to-Point Race, for the cup presented by Lord Llan-gattock, will take place at Hurlingham Club, Fulham, S.W., on Saturday, the 27th inst.

The following entries have so far been received:—

	Entrant.	Balloon.	Pilot.
Capt. Hon. Claud Brabazon...	Mercury ...	Capt. Hon. Claud	Brabazon
John Dunville...	Banshee II	John Dunville	
Hon. Mrs. Assheton Harbord	North Star	C. F. Pollock	
A. P. Hobler ...	Uranus ...	A. P. Hobler	
Capt. E. M. Maitland	Pompadour	Capt. E. M. Maitland	
Gustav P. Stollwerck...	Continental	Gustav P. Stollwerck	

Members of the Royal Aero Club will be admitted to the Hurlingham Club free, on presentation of their Royal Aero Club membership cards.

Members of the Royal Aero Club can obtain special vouchers for the admission of their friends, who are not members of the Royal Aero Club, to Hurlingham, from the Secretary of the Royal Aero Club. These vouchers will admit on payment at the entrance gates.

HAROLD E. PERRIN,
Secretary.

166, Piccadilly.



ABOUT THE COUNTRY.

Manchester Ae.C. (Model Section) (52, MANSFIELD CHAMBERS).

THERE will be a general meeting of the members at the club workshop, Brownsfield Mills, Great Ancoats Street, Manchester, on Wednesday, May 31st, at 7.30 p.m. Objects: to elect officers, arrange the season's programme, and to decide upon the best methods for encouraging the scientific model. Members of the Manchester Aero Club and others interested are also invited to attend.

Model Club for Brighton.

IT is proposed to start a model club for Brighton and district, and all youths interested in the subject are asked to communicate with Mr. H. Knowles, 204, Church Road, Hove.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Flying Ground, Eastchurch.

THE weather has continued fine here throughout last week, except for a break on Wednesday, when a stiffish breeze was blowing all day, and on Sunday, when there was a steady downpour of much-needed rain.

On Thursday a visit was paid to the grounds by H.R.H. Prince Louis of Battenberg, who witnessed several good flights of from 15 to 20 mins. each by Lieuts. Samson, Gerard, Longmore and Gregory, all on a Short biplane; also passenger-carrying trips by the two first-named. Subsequently His Royal Highness was conducted over Messrs. Short Bros.' factory by Lieut. Samson and Mr. Horace L. Short, and evinced the deepest interest in the work in progress.

In the early hours of Saturday morning Sheerness was twice visited by aeroplane. Lieut. Samson was first away on Short biplane No. 34, leaving the sheds at about 6.15. After a circuit of the grounds he headed for Sheerness, rising all the time until he had reached a height of about 3,500 ft. After he had disappeared from sight some 20 minutes elapsed before he was again located, a faint speck in the sky, steadily approaching from the direction in which he had vanished. Arrived once more over the grounds, Lieut. Samson executed a magnificent descent by a spiral *vol plané* from 3,500 ft., landing perfectly just outside the shed, after 35 minutes aloft.

Lieut. Gerard was next up, and he too passed over Sheerness at some 1,500 ft. Each of the two officers named later took up passengers for flights of about 10 minutes each.

Between the hours of 5 and 8 p.m. on Saturday a great amount of work was got through, the most notable incident to record being two successive flights of Naval officers (piloting), with passengers as observers, over and around the warships stationed off Sheerness. Last week we were able to record the first flight of a British Naval officer over the Fleet, and now, within a week, we have witnessed the first passenger-carrying flights over these vessels. Lieut. A. M. Longmore was the first to attempt this, and he passed round H.M.S. "Actaeon" at a height of some 1,000 ft. Later, Lieut. Gerard, also carrying a passenger, made a similar journey at about the same altitude.

Lieuts. Gregory and Samson both made trips to Sheerness, the former flying at about 1,500 ft. over Queenborough, to H.M.S. "Antrim," around which he circled, then passing along to the Fort and out to sea for some distance, ultimately returning by way of the golf links to the aerodrome. Later, the same pilot conveyed a passenger to Leysdown and back, and Lieut. Longmore concluded the day's work with a flight over to the mainland, with a passenger, at 1,500 ft. In the latter flights, it should be mentioned, the wind was up to 22 miles an hour according to Dines anemometer.

On Sunday the Naval officers take a rest, so Prof. Huntington, who had his machine out for a further trial, had the grounds to himself. During the day he made several flights, and showed considerable improvement.

On Monday morning Lieut. Gerard made two flights, each of about 15 mins. duration. Lieut. Gregory once more essayed a journey to his ship (H.M.S. "Antrim"). After circling above her he returned by way of Port Victoria and Kings Ferry, on the way passing over the German Imperial yacht, the "Hohenzollern," with the Emperor and Empress on board.

In the evening, from 6 until 8 o'clock, there was a further spell of hard work, the Hon. Maurice Egerton and Lieuts. Samson, Gerard, Longmore and Gregory all making cross-country flights of from 15 to 30 minutes each.

On Tuesday morning Lieuts. Samson and Gerard each made flights of about 15 minutes' duration over the neighbouring country.

In the evening all four officers were again busy, the principal flights being made by Lieuts. Samson, Longmore, and Gerard. The first-named made two flights, first one of 25 minutes, during which he passed over the villages of Eastchurch and Minster, and later journeying to Sheerness, passing on the way over the German Imperial yacht at her moorings. Lieut. Longmore also made the same journey, while Lieut. Gerard was content with a skilful flight over the country in the immediate vicinity of the grounds.

Brooklands Aerodrome.

Avro School.—On Thursday last week for his third time on the Avro biplane, and without any previous experience, Stanley Adams put up a very pretty flight, rising to 800 ft. and doing figures of eight. Ronald Kemp and Raynham were also flying in the evening. Mr. Pixton started for Hendon and was soon out of sight, but returned reporting much mist and a strong wind high up, although he found the wind very steady and not troublesome.

Friday morning Pixton flew over to Hendon in 48 mins. against a strong head wind. During the trip he found it rather hard to find his way owing to the mist and smoke blowing over from London. At Hendon he gave a good display, and it was noticeable that

except Mr. Cody he was the only one to do right-hand turns as well as left. Among the passengers he carried was Commander Sampson, of the Barrow naval airship, who was taken outside the aerodrome and expressed much surprise at so low powered an engine carrying a passenger. A. V. Roe then took the pilot's seat and went for a turn, it being his first circle on the biplane. Afterwards Ronald Kemp gave a display of figures of 8.

Saturday morning Pixton arrived back from Hendon in 35 mins., again finding it very misty. Conway Jenkins, Ronald Kemp, and Pixton were all busy carrying passengers during the afternoon, and in the evening Lieut. Beatty flew splendidly for his certificate, his turns being so sharp that it rather alarmed the onlookers as he banked well over, but Lieut. Beatty himself was not the least concerned. His *vol plané*s were excellent, he landing about 30 yards from the observers; unfortunately owing to an air-lock the water began to boil during the last figure eight of the final test.

Monday proved an ideal day. Two new pupils, Mr. S. V. Sieppe and Hunter, were making straight flights. Lieut. Boothby was also making straight flights. Mr. Hunter rather scared the spectators by running into the river at a part where the bank is very steep. Ropes were soon tied to the machine and it was hauled out without any damage, although part of the engine and the lower planes were under water.

A. V. Roe flew it back to the sheds with water dripping from the lower planes, as, being double surfaced, they still retained some water.

Lieut. Parke took up Mr. H. V. Roe (the business manager of A. V. Roe and Co.) on the firm's Farman, and some alarm was felt when he disappeared cross-country, flying very low, as the machine was working with a borrowed propeller, which was really not suited to the machine. In order to watch proceedings, A. V. Roe then went up on the Avro biplane, and saw them heading back again very low, among the tree tops, they managing to get back with very little to spare.

Tuesday morning, Stanley Adams, S. V. Sieppe, and Hunter were flying on the Avro; the first named promises very well, showing great control of the machine.



Mr. Maurice Tetard flying a "Bristol" military biplane at Filton upon the occasion of the recent visit to the British and Colonial Aeroplane Co.'s works of the officers and crew of H.M.S. "Bristol."

Filey School (Blackburn Aeroplane Co.)

MR. HUCKS on Tuesday afternoon of last week took the air on a Mercury type machine, making several flights, amounting in all to $22\frac{1}{2}$ miles. While in the air he made many figures of 8. Mr. Hucks flew 40 miles altogether that day.

On Saturday and Sunday Mr. R. T. Weiss took out his Blériot type machine, manufactured for him by the Blackburn Aeroplane Co. He made several trial runs along the sands, until the wind at length caught one of the planes and threw the machine on to its head. Mr. Weiss was unhurt. On Wednesday Mr. Hucks succeeded in flying from Filey to the Scarborough Racecourse, a distance of 8 miles.

Lanark's School Opened.

ON Saturday last Mr. W. H. Ewen formally opened the school which he is carrying on at the aerodrome used for the Lanark meeting last year, and on Monday and Tuesday he made several flights on his Blériot machine. Already a number of pupils have joined the school, which promises to be very successful.

Liverpool Aviation School, Sandheys Avenue, Waterloo.

ON Saturday, the 6th inst., Mr. Dukinfield Jones was out rolling for the first time for an hour before breakfast, and daily up to the 11th inst. he put in an hour's rolling early, but was prevented from further practice owing to the winds prevailing.

On the 11th Mr. H. G. Melly, the principal, had the Blériot two-seater out for the first time, making three circular flights out to sea of about 2 miles each, in the first case by himself, in the other two taking Mr. Jones with him as passenger, at a height of between 300 and 400 ft., and terminating in each case with a fine *vol plané*.

On the 12th inst. Mr. Jones succeeded in hopping repeatedly, and Mr. H. G. Melly again had the two-seater out with Mr. Jones as passenger.

On the 13th inst. Mr. Jones put in some good work early, accomplishing two low straight flights over 100 yards each; the wind afterwards rising precluding further flying for the day.

London Aerodrome, Collindale Avenue, Hendon.

Blériot School.—Wednesday and Thursday of last week were spent in preparing three new machines for the Parliamentary demonstration which took place with so much success on Friday. The new 50-h.p. Gnome-Blériot, as shown at the Olympia Exhibition, was tried by Messrs. Hamel and Kadley, who were both delighted with the results, the monoplane proving exceedingly fast and handy.

Saturday was another busy day, Messrs. Salmet and Henderson were circling the ground and making figures of 8, whilst Messrs. Abercromby, Seaman, Dyott, and Gordon Jones were indulging in some straight flights.

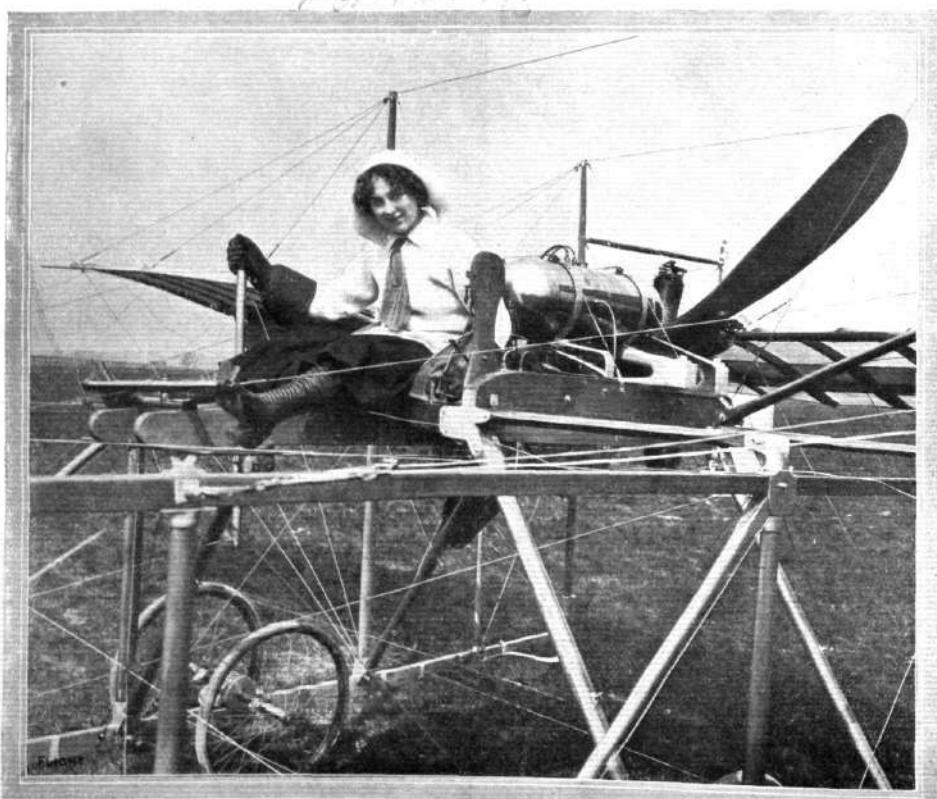
Monday all the pupils were out, and without doubt several certificates will be gained very shortly by some of the most advanced pupils.

A new monoplane has just been added to the school machines for the trial flights for the Royal Aero Club certificate, and Mr. G. Hamel will be definitely attached to the school to fly the passenger machine for the benefit of the pupils, &c.

The Grahame-White School.—The pupils and instructors were very busy on Wednesday, the 10th. Throughout the early morning all the pupils were given several lessons on the school Farman, whilst Higgins and Davis had a good deal of practice, flying laps of the aerodrome with regularity.

During the afternoon Mr. Grahame-White arrived at the aerodrome, and made several flights on the new Farman for the purpose of experimenting with weight dropping from different altitudes. Quite an exciting episode happened in the evening. Capt. Higgins was flying right outside the aerodrome, when the machine was seen to plunge suddenly towards the ground.

Mr. Grahame-White immediately mounted his Farman and flew to the rescue—finding Higgins and the machine practically intact in the grounds of the neighbouring hospital. Higgins had merely descended on account of hearing a rather suspicious noise emanating from the back of the machine. It was afterwards discovered that



Miss Edith Meeze, a promising pupil at the Valkyrie Aviation School at Hendon, in the pilot's seat of the school machine.

a wire had broken in the region of the engine, and after this was replaced Hubert flew the machine back to the aerodrome in company with Mr. Grahame-White.

Friday, the 12th, was the date fixed for the Flying Demonstration under the control of the Parliamentary Aerial Defence Committee. The Clerk of the Weather was exceptionally kind, as we were favoured with one of those superbly calm days that are so few and far between. A full account of the flying will be found elsewhere in this issue.

Rain prevailed during Saturday morning, and it was not until the afternoon that the machines could be brought out.

Grahame-White made several trips with passengers on the military Farman, among whom was Lord Curzon. Greswell flew his Gnome-Blériot a good deal throughout the afternoon, ascending to quite 2,000 ft. on one occasion, and planing to earth. Travers, on the school Farman, practised the right hand turn several times during a good flight of 20 mins. duration, and descended in order to immediately set out for his test flights. These were successfully accomplished, Mr. Harold Perrin and Mr. Harry Delacombe acting as official observers.

It was only very early on Sunday morning that flying could be undertaken, as during the rest of the day the rain fell in torrents.

Mrs. Martin had a lesson, and afterwards made several straight flights, at an average height of 30 ft., across the whole length of the ground. This, for a lady pupil, is decidedly promising.

At 1 o'clock on Monday afternoon Mr. Martin mounted the newly-erected Farman, and after a preliminary circuit or two flew away in the direction of Hendon village. Just before reaching Ealing he circled and returned to the aerodrome.

Meanwhile Mrs. Martin had more practice at straight flights.

A very funny incident occurred during the afternoon. Kagus had done a good deal of rolling on the school Anzani-Blériot and had clambered out in order to straighten the machine up for a flight back to the hangars, when he found that he had not sufficiently retarded the ignition of his motor. In vain he tried to check its progress, but the machine dragged him on to his knees and he was forced to release his hold. For quite ten minutes the machine dashed about the ground at about 25 miles an hour, evading all attempts at recapture.

Eventually Mr. Grahame-White succeeded in grabbing a wing-tip, and it was not until the machine had described several circles with that gentleman as the pivot that it was completely overpowered and escorted back to the hangar. Mr. Grahame-White made a very fine flight during the evening with two passengers on his military Farman. Attaining an altitude of quite 800 ft. he flew towards Cricklewood, and returned to the aerodrome after circling the Welsh Harp waters.

At about 7.15 p.m., after a preliminary practice flight, Capt. Higgins successfully performed the test flights for his pilot's certificate.

Tuesday saw Mrs. Martin out early on the school Farman, making circuits of the ground in excellent style. Before retiring she had a flight of six circuits to her credit. Mr. Martin gave instruction to Messrs. Greig and Davies, taking each for lengthy flights. Mr. Grahame-White flew the "Baby" biplane for the purpose of testing a new propeller. A high flight by Clement Greswell on the Gnome-Blériot finished the day's operations, the wind having risen too much to allow pupils to go out.

Valkyrie School.—Great disappointment was experienced at the Valkyrie School on Friday, 12th inst., owing to the controllers of the aerodrome not permitting even one of the five Valkyrie machines to take part in the military tests.

On Saturday, May 13th, school work started at 5 a.m., and the following pupils each had lessons:—Miss Meeze, Messrs. Perry, Chambers, Benson, Hawker, Clutterbuck, and Turner. Messrs. Turner, Perry, and Hawker are making rapid progress and executed very steady flights at a moderate height. In the afternoon, about 2,000 people being present, the Valkyrie designer made numerous flights, each of from half-an-hour to an hour in duration, during which all the evolutions known to airmen were made with precision and steadiness. Moreover, certain of these evolutions were of quite a startling character, notably quickly ascending in a cork-screw spiral, the diameter of which was only 100 to 120 yards, and descending in the same way with engine stopped. The pilot then gave an impressive demonstration of the inherent stability of the Valkyrie. For over a mile, steering a circular course, he flew the machine steadily with both hands off the controls and held high above his head.

At the expiration of this demonstration Lieut. Wells, of the Indian Army, joined the Valkyrie School, while Messrs. R. H. Klein and A. Wendell Jackson and Miss A. A. Morten were given passenger flights.

The morning of Monday last was taken up with numerous passenger flights, among those ascending being Messrs. Perry, Chambers, Sadlet, Turner, Miss Meeze, and Lieuts. W. D. and N. E. Barber. The school machine was very busy, being kept in the air almost continuously by different pupils, among whom Messrs. Perry, Hawker, Benson and Miss Meeze are coming on remarkably quickly. Mr. Benson was circling the aerodrome in fine style and should secure his certificate speedily. In the evening more passenger flights were given, several passengers being taken to a height of 300 ft. There was a considerable crowd present, including several members of the Royal Aero Club, and at the request of Prince Bolkhoff a demonstration was given of the new



TWO OF THE FLYERS ON BRISTOL BIPLANES AT SALISBURY PLAIN.—On the left Mr. R. W. Philpott, and on the right Mr. E. Hotchkiss, who took his brevet on Tuesday, he being the ninth Bristol pupil to secure his certificate during the last three weeks.

Type B military monoplane. It was a magnificent flight, the pilot taking it up to a height of 2,000 ft., and from that level descending by means of a spiral *vol plané* with engine stopped. The pilot then made a "stability" flight of three times round the aerodrome with both hands off the controls and above his head. An ascent was afterwards made in the form of a corkscrew spiral to a height of over 500 ft., the diameter of the spiral not being more than 120 yards.

On Tuesday morning the pupils were very busy taking full advantage of the weather, while in the evening another excellent flight was made with the Type B military Valkyrie; and although the wind was blowing at a velocity of from 20 to 25 miles an hour, the pilot had no difficulty in climbing to a height of at least 2,000 ft., from which he descended by means of an impressive spiral *vol plané*.

Salisbury Plain.

The weather on Wednesday of last week was too rough for the pupils at the Bristol School to do any flying, but on Thursday there was a welcome change in the atmospheric conditions, and at half-past four Mr. Pizey had the new Bristol for Mr. Morison brought out, and after one circle of the camp headed off for Brighton, where he was delivering it, his altitude being about 2,000 ft. Soon after starting he was overtaken by a thunderstorm, and his experiences in connection therewith will be found recorded on page 440.

On Friday the pupils at the Bristol School were very busy. Vusepey was the first out, and, flying at a good height, he took up Messrs. H. Busteed and E. Harrison, of the Tarrant Motor Co., Melbourne, Australia, who have just joined the Bristol school.

The Air Battalion, bringing one machine, has now arrived from Aldershot for training, and four machines have since been taken over from the Bristol Co. These have been erected by the Bristol Co.'s staff, the work being watched by members of the Air Corps for the purpose of instruction.

Saturday was fine day, and two new machines arrived at the Bristol school, as well as the biplane used by M. Jullerot for his Indian tour. Vusepey and M. Jullerot each made several trips with pupils.

On Sunday no flying was indulged in until the evening, when M. Jullerot was the first to take the air, being followed by Mr. Fleming and Mr. Pizey, all of whom carried pupils for instructional

flights. Vusepey took up Mr. G. Abbott, of Bristol, for a good trip at a height of 1,200 ft. After landing he went up again on the military extension biplane, this time taking Mme. Grandseigne for her fifth trip. One of the pupils met with a slight accident while out rolling for the first time. He shut off his engine too soon, and landing badly, damaged the propeller and a strut or two. He, however, was uninjured.

On Monday morning conditions were splendid for flying, and Mr. Fleming was out early on one of the military extension biplanes, flying very steadily and making a fine *vol plané*. On a second trip he took up Lieut. T. H. Sebag Montefiore as passenger. He flew around the camps, Stonehenge, Amesbury and Bulford Camp, at a height of about 1,000 ft., finishing with a fine gliding flight. In the afternoon Mr. Hotchkiss was out and completed the tests for his pilot's certificate. When Mr. Hotchkiss was out for his final test two figures of eight were carried out at a height of 600 ft., and although two cylinders in his motor stopped firing, he managed to keep up until he had finished the test. School work was continued until 8.45 p.m., M. Jullerot, Mr. Fleming and Mr. Pizey continually taking up pupils until darkness set in, while Vusepey carried Mme. Grandseigne for another lengthy flight.

The weather was also very fine on Tuesday morning, and Mr. Hoskins, who is about to join the school, was taken for a long and high flight by Mr. Fleming. M. Jullerot was also flying with pupils. Capt. Fulton, Lieut. Cammel, Lieut. Reynolds and a great number of Royal Engineers are at Salisbury Plain anxious to begin work there. The new hangars are being pushed forward very quickly, and should be ready for occupation soon. The Bristol racing biplane is now in order for trial trips.

It is interesting to summarise the large amount of work which has been carried out at the Bristol School during the past four weeks. In all 190 flights have been made, and of these 50 were to the credit of pupils, while of the others 70 were made by M. Jullerot, 46 by Mr. Collens Pizey, and 24 by Mr. H. R. Fleming. Six brevets have been secured in the following rotation: Gordon England, H. R. Fleming, C. C. Turner, Philpott, Capt. Massy and E. Hotchkiss, while four more pupils are now making solo flights. All the pupils at the school seem to follow the example of their instructor, M. Jullerot, in attaining considerable altitude, and it is noticeable that when certificates are obtained the test flights are made at heights greatly exceeding the required 50 metres.



FOREIGN AVIATION NEWS.

Paris-Bordeaux-Paris.

TUESDAY, July 11th, has now been fixed upon as the definite date of the great cross-country event of the Aero Club of France from Paris to Bordeaux and back. The local authorities at Bordeaux, Tours and Chatellerault are entering into the arrangements with the greatest enthusiasm to ensure success for the competition.

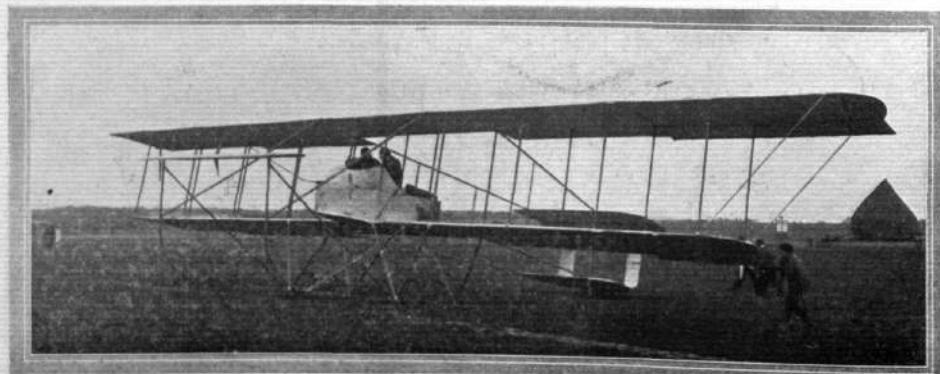
Record Cross-Country Flying.

TAKING advantage of a strong following wind, Weymann, on his Nieuport monoplane, flew with a passenger from Mourmelon to Reims in exactly 10½ minutes, the speed working out at 100 miles

an hour. Immediately afterwards Lieut. Fequant, with another officer, on a similar machine, also covered the same course and bettered the time by about half a minute, his speed working out to over 101 m.p.h.

A Long Flight on a Morane.

LEAVING the Vidamée Aerodrome on a Gnome-engined Morane monoplane, with which he had had but a very limited experience, Brindejone de Moulinais made an excursion of about 128 kilometers across country on the 9th inst., passing by the towns of Noyon and Péronne, landing eventually at Chantilly. During the flight he kept mostly at a height of 1,200 metres.



THE MILITARY TYPE MAURICE FARMAN BIPLANE.—This view shows clearly the extensions fitted to the machine, and also the arrangement of the chassis.

New Speed Records.

WITH a monoplane entirely of his own construction except or the propeller, which was of the Regy make, Nieuport on the 11th inst., at Mourmelon, succeeded in beating all the world's speed records over the distances from 10 to 100 kiloms. In the following table are given the new figures, as well as the old records which were to the credit of Leblanc and the Blériot monoplane :-

Nieuport.	Leblanc.	Nieuport.	Leblanc.
New records.	Old records.	New records.	Old records.
kils. h. m.	h. m.	kils. h. m.	h. m.
10 5 7	... 5 30	40 20 12	... 22 12½
20 10 9½	... 11 4½	50 25 14½	... 27 41½
30 15 11½	... 16 38½	100 50 36	... 54 51½

The monoplane was fitted with a two-cylinder horizontal engine of 28-h.p., built by M. Nieuport, while the magneto and sparking plugs were also of his manufacture. It will be seen that the highest speed attained was 119·63 k.p.h., which is a considerable advance on Leblanc's 111·89 k.p.h.

Paris-Madrid Race.

FOR the second half of the Paris-Madrid race, which is due to start on the 21st inst., the aviators will have to gradually climb from San Sebastian to Puerto de Somosierra, the altitude of the former place being 23 metres above sea level, while at the last-mentioned point, which is 330 kiloms. from San Sebastian, the height is 1,460 metres. Thereafter the ground gradually descends to Madrid, which is situated at an altitude of 705 metres. The distance from San Sebastian to Madrid is 428 kiloms.

Training for the Paris-Madrid Race.

AT several of the French schools aviators are now practising diligently in view of the important events to be held this summer. The Paris-Madrid race appears to be the one receiving most attention at the moment, and on Sunday, at La Vidamée, Verrept was in the air for three hours on the Morane monoplane he will use in this event. On Monday Prince de Nissolle, who is another intending competitor, was flying over Etampes on the Paris-Madrid Tellier machine at a good height.

Aeroplane versus Submarine Tests.

THE French aviator, Naval Lieut. Conneau, and a submarine officer, Lieut. Masse, have addressed to the French Naval Authorities a request that they may be authorised to carry out, in the neighbourhood of Toulon, a series of combined tests with their respective "craft." Their request is being backed up by the other officers as it is felt that such tests would lead to a great deal of valuable information being obtained.

French Military Aviators.

TRYING for his special military certificate, Lieut. Ducourneau left the Pau Aerodrome on the 8th inst. and flew to Dax and back on his Blériot monoplane, covering a total distance of 115 kiloms. A similar trip was also made by Captain Echeman. On the following day Lieut. Malherbe and Lieut. Ducourneau each made a circuit of 150 kiloms. across country while Lieut. Sourdeau was flying for an hour. On May 12th Lieut. Tretarre on a Breguet



Mr. Maurice Farman and his father after the recent long flight from Buc to Etampes and back, which Farman *pere* indulged in recently. Mr. Farman, *sen.*, it will be remembered is the well-known Paris correspondent of the "Standard."

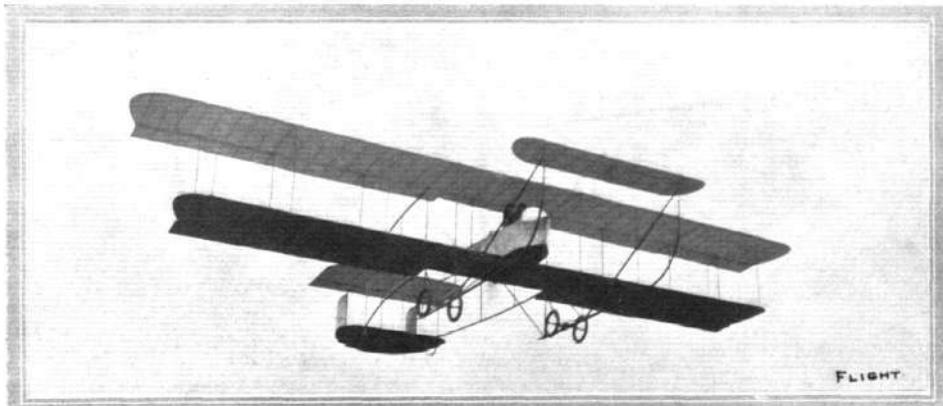
machine left the Brayelle Aerodrome near Douai and flew to Doullens and back, covering a distance of 110 kiloms. in 1 hr. 6 mins.

Flying at Orleans.

ON the occasion of the fêtes held at Orleans on the 8th inst. in honour of Joan of Arc, some very good flights were made by Barra on a Maurice Farman, Pascal on a Deperdussin, and Bathiat on a Sommer monoplane. Two days after the fêtes Barra returned to his headquarters at Buc on his aeroplane.

A Fast Caudron.

AT his school at Rue, René Caudron, on the 12th inst., carried out some satisfactory trials with a new and very fast biplane. It is of only 17 metres span, and is fitted with a 6-cyl. Anzani motor.



THE MILITARY TYPE MAURICE FARMAN BIPLANE.—A snapshot of the machine in full flight.

Aeroplanes for Reporters.

WISHING to deal with the event from a new point of view, M. Violette, Editor of *La Vie du Grand Air*, went up in a Farman biplane from Etampes and followed the great Bordeaux to Paris cycle race on Sunday for about two hours. Eventually the wind became so strong that the aviator decided to come down.

A Two-Hour Flight on a Goupy.

ON one of the military type Goupy biplanes Lieut. d'Aiguillon was in the air for a couple of hours on the 14th inst. at Juvisy. During most of the trip he kept at a height of about 100 metres.

Fatal German Accident.

ALTHOUGH a thick mist prevailed at Johannisthal on Thursday morning of last week, a young German aviator, Hans Bockmuller, persisted in going up on his machine. He lost his bearings, and eventually collided with the roof of a Post Office building. He was impaled on the rafters and sustained such serious internal injuries that he died before a doctor could reach him.

A New Belgian Aerodrome.

ON the 13th inst. the King of the Belgians attended the opening of a new flying ground which has been laid out at Berchem not far from Antwerp. By way of inaugurating the flying school there, several flights were made by Belgian aviators, one of the most notable of which was that made from Antwerp to Berchem by Count d'Hespel.

An Aerial Taxicab for Switzerland.

LUZERNE is to have the distinction of getting the first aerial taxicab. A Maurice Farman biplane has been specially fitted with a taximeter, which will record the kilometres flown and the charges therefor. Half a dozen floats have been attached to the lower part of the machine to facilitate rising from and descent upon the surface of the lake. Four of these floats, which are in the shape of circular tanks with blunt pointed ends, are disposed in pairs on the chassis under the middle of the main planes, while the other two are fitted under the tail. Maurice Herbster is to be the pilot.

Flying at Florence.

SOME good flying was seen at Florence during the closing days of last week in connection with the meeting there. Renaux on a Maurice Farman, Tabuteau on a Bristol, Vedrines and Frey on a Morane, Manissero on a Blériot, Mdlle. Dutrieu, Cagno, and Eros on Henry Farman machines, among others, contributing to the programme each day. On the 10th inst., a height competition resulted in the favour of Manissero on Blériot, who got up to 1,700 metres, while Renaux and Vedrines tied for second place at 1,500 metres. On the 11th inst., when the King and Queen of

Italy paid a visit to the aerodrome, they witnessed flights by Tabuteau, Renaux, Vedrines, and Mdlle. Dutrieu, each of whom were afterwards presented to their Majesties. On Sunday last, a handicap was held over a distance of 5 kiloms., and this was won by Mdlle. Dutrieu, who thereby secured the King's Cup. The best time for five rounds of the kilometre course was by Frey in 4 mins. 1 sec., while Vedrines was second with 4 mins. 7 secs.

A Bristol Biplane in New South Wales.

GENERAL GORDON, Commandant of the New South Wales military forces, enjoyed a fine flight on the 9th inst. with Mr. Leslie McDonald on a Bristol military biplane. Mr. McDonald took the machine up to a height of 3,000 ft. and then flew for a distance of 30 miles, passing over Botany Fort, Military Barracks, Government House and Sydney Harbour, where a number of warships were lying at anchor.

Morane Monoplanes in Spain.

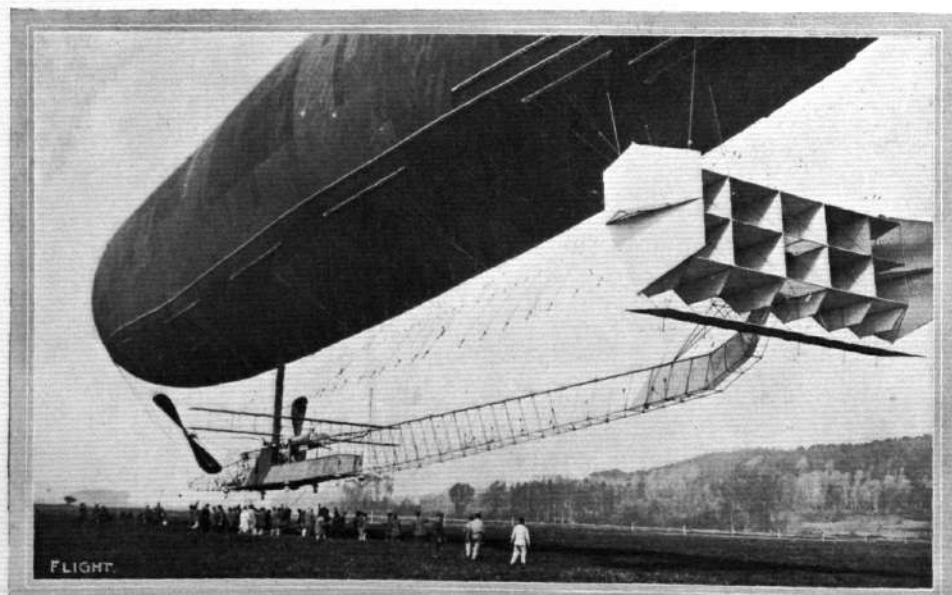
GREAT success attended the visit of MM. Gaget and Frey with their Morane monoplanes to Saragossa. On the 26th ult. Gaget won a cup offered by the town and £400 by completing a circuit of 100 kiloms. round Saragossa. Frey, who also completed the circuit, beat the Spanish altitude record by rising to 2,050 metres.

Van den Born's Adventures in China.

ON reaching Paris on the 9th inst. Van den Born had an exciting tale to tell of his tour in China and the dramatic way in which it concluded at Canton. Van den Born had made one or two trips before the Tarr General of Kwangtung, who, on returning from one of these exhibitions, was shot dead by Anarchists. The populace became very excited, and accused the flyer of the crime, and anticipating serious trouble the authorities advised him to leave the district at once. He took his machine to pieces and packed it up, but then could get no one to transport it, so was finally obliged to destroy it himself. The machine was a biplane of his own design, which incorporated several modifications suggested by his long experience. The planes, for instance, were very flat and they were made in sections, so that the machine could be easily dismantled for transport.

American Military Flyer Killed.

THE number of American military aviators is very small, and Lieut. Kelly, who met with a fatal accident while flying at San Antonio, Texas, on Wednesday of last week, is a grievous loss to the U.S. Army. He was piloting a Curtiss aeroplane near Fort Sam Houston, and when about 50 feet from the ground appeared to be shot out of his seat. The unfortunate officer fell on his head with fatal results.



A view of the new Clement-Bayard as seen from the rear end.

AIRSHIP NEWS.

The Navy "Airship No. 1."

UPON the authority of Mr. McKenna, in the House of Commons, the total liability voted for the naval airship built at Barrow was for the hull and machinery £40,876; and for spare gear £681.

The "Deutschland" Again Wrecked.

THERE is something almost uncanny in the way in which the Zeppelin airships are persistently dogged by misfortune, and the disaster which overtook the reconstructed aerial liner "Deutschland," after being in use for little more than a month, must be very discouraging to those who have pinned their faith to this type of craft. Since April 7th the vessel has been stationed at Dusseldorf, and it was to have been transferred to Baden-Baden on Wednesday. A satisfactory cruise had been carried out on Monday, and on Tuesday a number of passengers booked seats for a short aerial trip. At the time fixed for the start the wind, however, was blowing rather strongly. Nevertheless, after waiting for some time, those in charge of the airship decided to bring her out, which was done, but before she could be released from her human "anchor" of 120 men, she was struck by a squall and driven against the garage. The bows of the vessel rested on the roof, and the strain on the framework caused it to be twisted and damaged to such an extent that it will have to be entirely reconstructed, while several of the ballonets were

torn. The two cars, in which were four lady passengers as well as the crew, remained suspended in the air, and the occupants were eventually rescued by the Fire Brigade. Fortunately, no one was injured. It is proposed to reconstruct the airship at Dusseldorf, but this will take considerable time, and it is doubtful if she can be put into commission again this year.

Another Dirigible for Holland.

PILOTED by Count Henry de la Vaulx, the new Zodiac dirigible, which has been built for the Dutch Army, underwent a test of half-an-hour at the beginning of the week. It is claimed that the dirigible, which is named "Duindigt," is the smallest military dirigible in the world. The envelope has a capacity of 900 cubic metres, while the speed works out to between 35 and 40 k.p.h.

The New Italian Dirigible.

ON Thursday of last week a very satisfactory trial trip was carried out with the new Italian military dirigible, which belongs to the smaller series. Starting from the hangar, near Verona, with five persons on board, she cruised along the Mincio Valley, over Dossobuono, Villafranca, Nozerone and Vallegio, afterwards returning to the starting point, a distance of about 65 kiloms. being covered in about an hour and 20 mins. The envelope of the airship is 63 metres in length, and holds 4,000 cubic metres of gas.



ATMOSPHERIC FRICTION.

By A. F. ZAHM.

(Continued from page 428.)

IT should be remarked that the minimum resistance already given is such only for the symmetrical shapes in question, but not necessarily a minimum for all possible shapes having the same major section. In fact, when a five-calibre bow, shown by the dotted line in Fig. 7, was combined with a 50-calibre stern, the resistance was much diminished, and it was found incidentally that the ratio of the resistance of a good model to that of its major section can be made less than one part in eight. What the ratio may be for the shape of least possible resistance has not been ascertained.

Similar experiments were made with spindles having the outline shown in Fig. 8, and with like results. These are still unfinished; but it may be mentioned, in passing, that the frictional effect is very manifest. The total resistance of a symmetrical spindle having such outline is again half friction, and has its minimum value in a model of about twelve calibres, for which the length is nearly seven times the major diameter—a relation given by Rankine for well-formed ships. A still less resistance is found when a two-calibre bow, shown dotted in Fig. 8, is combined with a twelve-calibre stern, in which case the length is about five times the major diameter. The

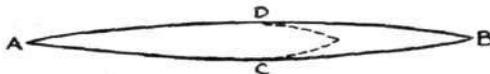


Fig. 8.—Symmetrical ogival spindle of minimum resistance.

ratio of the resistances of the spindle and its major section has been reduced to about one part in eight. What the smallest possible ratio may be for a given velocity has still to be ascertained, and may well form the object of a special research.

The foregoing samples suffice to indicate the importance of the friction term in the general equations of aerodynamics. We may now notice its bearing on problems of transportation, and particularly the cost of propulsion in aeronautics. Let us consider the soaring plane, first assuming it smooth, then frictional.

Let A be the area of the plane, W its weight, v its velocity, α its angle of flight, R its resistance, H the propulsive power, and s the density of the fluid in which it is moving. Then, if the plane is frictionless and steadily soaring on a horizontal course in still air,

$$R = W \tan \alpha \quad \dots \quad (a)$$

$$H = Rv \quad \dots \quad (b)$$

$$W = \frac{2ks}{2} Av^2 \sin \alpha \cos \alpha \quad \dots \quad (c)$$

$$1 + \sin^2 \alpha$$

the last expression being the lift as given by Duchemin's formula, in which k is a constant of figure.

The relations of these seven variables contain much that is of interest in the theory of the aeroplane. For example, let us find

the mileage cost and the propulsive power when the plane is just soaring.

The mileage cost is proportional to the resistance divided by the load, and hence, as shown by equation (a), it is directly proportional to the tangent of the angle of flight. It may, therefore, have any value, from zero to infinity, according to the inclination of the plane, and if this be kept constant the mileage cost is the same for all velocities, for whatever extent of surface, and for all densities of the medium, from mountain air to sea water.

In a similar way the mileage cost may be studied as a function of any of the other variables. Thus from equation (c) we obtain

$$\tan \alpha = \frac{W(1 + \sin^2 \alpha)}{2ks Av^2 (1 - \sin^2 \alpha)} \quad \dots \quad (d)$$

in which the ratio of the parenthetical factors is practically unity for small values of α . Hence, writing

$$\tan \alpha = \frac{W}{2ks Av^2} \quad \dots \quad (d')$$

it is at once evident that the mileage cost is directly proportional to the load, and inversely proportional to the density of the medium, the area of the plane, and the square of its velocity.

The propulsive power may be obtained directly from the last equation. Thus, $H = Wv \tan \alpha = \frac{2ks}{2} Av^3$. This shows that the power varies directly as the square of the load, and inversely as the density of the medium, the area and speed of the plane.

This last relation, viz., that if W , s , and A remain constant, H varies inversely as v , has been more emphasised than the other relations by the various writers on aeronautics. It was first proved, though in a different manner, by A. Du Roy de Bruijnac,* and formally enunciated by him in 1875, as follows: "Providing the angle of a heavy plane, moving in the air, be maintained at the minimum necessary to sustain its weight, the work of translation diminishes as the velocity increases." Mr. Curtis† gives a different analytical proof, and Lord Rayleigh, in his interesting memoir on "The Mechanical Principles of Flight," demonstrates analytically that "if frictional forces can be neglected, a high speed is all that is required in order to glide without energy." Mr. Chanute‡ has shown, by numerical computation, that De Bruijnac's statement may be applied to birds and flying machines moving at limited speeds, say 30 to 40 miles an hour; and Professor Langley has concluded from his experiments that the propulsive power of a material soaring plane diminishes with the speed up to at least 66 ft. a second, if the edge resistance be left out of the account.

Nearly identical with the expression for power is the equation for the speed of fall of a horizontal plane having lateral motion. If

* "Recherches sur la Navigation Aerienne."

† "Experiments in Aerodynamics," Langley.

‡ "Aerial Navigation."

be its edgewise speed, v_y , the speed of fall, then its true speed, v_z , equals $\sqrt{v_x^2 + v_y^2}$, and the angle, α , between v_z and the plane, is determined by the equation $\tan \alpha = v_y/v_x$. Substituting this value of α in equation (d), we have $\frac{v_y}{v_x} = \frac{W(1 + \sin^2 \alpha)}{2 k s A v^2 (1 - \sin^2 \alpha)}$, which, for

high speeds and moderate loading, becomes $v_y = \frac{W(1 + \sin^2 \alpha)}{2 k s A v}$,

since α is small, and v_x is nearly equal to v_z . Under these conditions the speed of fall varies inversely as the speed of flight, which means that the rate of descent and the power expended may be made indefinitely small by sufficiently increasing the speed. Of course, if the air has an upward trend equal to or greater than v_y , the plane will soar continuously on a horizontal or ascending course.

Suppose the gliding plane to dip δ degrees below the horizon, and to have a forward resistance. The angle of impact of the air is $\delta - \alpha$, in which $\tan \delta = v_y/v_x$, as before; and, when steady motion is established, the horizontal component of air pressure,

$\frac{2 k s A v^2 \sin \delta \sin \alpha}{1 + \sin^2 \delta}$, just equals the horizontal resistance. Accordingly the plane will glide continuously with the constant component velocities, v_x forward and v_y downward. If, however, the air has an upward trend equal to v_y , or greater, the plane will glide continuously on a horizontal, or ascending course. This is the principle of one kind of soaring practised by the birds.* It can be proved, by a slight extension of this argument, that soaring is possible even in a wind that alternately rises and falls.

* The Wright Brothers report that they can glide continuously down a seven-degree slope at a speed of 18 miles an hour in still air. This means that if the air has an upward trend of $18 \times \sin 7^\circ = 21$ miles an hour, they can glide on a horizontal course indefinitely at a speed of $18 \cos 7^\circ = 17.06$ miles an hour. Hence in a soaring pavilion having a forced upward draught of, say, 3 miles an hour, a group of machines could glide all day without motive power, rising and falling at pleasure. The power of such a draught is about $\frac{1}{3}$ th of a foot-lb. per second, over each square foot of floor surface. Hence two horse-power can maintain such a draught continuously over 5,500 square feet of surface, working at an efficiency of 50 per cent.

(To be concluded.)



CORRESPONDENCE.

* * * The name and address of the writer (not necessarily for publication) must in all cases accompany letters intended for insertion, or containing queries.

Correspondents communicating with regard to letters which they have read in FLIGHT, would much facilitate ready reference by quoting the number of each such letter.

NOTE.—Owing to the great mass of valuable and interesting correspondence which we receive, immediate publication is impossible, but each letter will appear practically in sequence and at the earliest possible moment.

The Sirie Monoplane.

[1175] Aeroplanes are usually classed according to their distinctive features, as the Blériot, Farman and the Tellefer, and the present one is no exception to the rule, except in this particular, that it takes its name not from its inventor but from the name of a tropical tree, which it resembles. The leaves of this tree are, in fact, miniature monoplanes, and soar through the air for long distances before they reach the ground.

The machine consists essentially of two large concave wings, somewhat similar in clinure to the wings of a crow when soaring. These wings are fixed to the main carriage, as indicated, and have a span of 18 ft. from tip to tip. In crossing one another they form a triangle, where the engine is fixed. The vertical plane between the wings is a control plane to prevent zig-zag flight. This takes the place of the usual tail in other monoplanes.

Two elevating planes are fixed at the front of the machine, and are operated from the carriage by means of rods. They can move in four different ways, so that by simply turning the right hand plane the machine swerves to the right. Planing up and down is accomplished in the same simple manner. The engine and petrol supply is conveniently placed to the operator. Numerous experiments have been carried out by the inventor on a model of this machine, and the results have been so highly satisfactory that he is led to believe that this type of monoplane will surpass in speed and stability many of the popular types of the present day.

2, Hamilton Terrace, East Partick. M. LESLIE-MILLER.

Steering by Compass.

[1176] May I be allowed to acknowledge the kindly references of C. O. and Mr. Graham Davies to my article on above subject. Both letters are interesting contributions to the discussion.

I may point out that in line 25 of the second column, "when" was omitted. It should read "so that when he gets an observation, &c."

R.A. (retired).

The Valkyrie Machines and the Hendon Demonstration.

[1177] Having regard to various mis-statements which have appeared concerning the reasons for our Valkyrie military monoplanes not taking part in the flying demonstration at Hendon last Friday, we shall be much obliged if you will publish this letter, in which we beg to give the facts of the case.

Several days before the demonstration we were notified in writing that we must not fly on Friday except by invitation, and at the same time we were informed that it was not possible to extend any invitation to us. No reason was forthcoming, although we protested most strongly. We may say that we were the first tenants of the Hendon Aerodrome. When Friday arrived we prepared to ascend at a time when no other machines were in the air, but were prevented from doing so, though our machine could easily have kept several thousand feet above the heights attained that day.

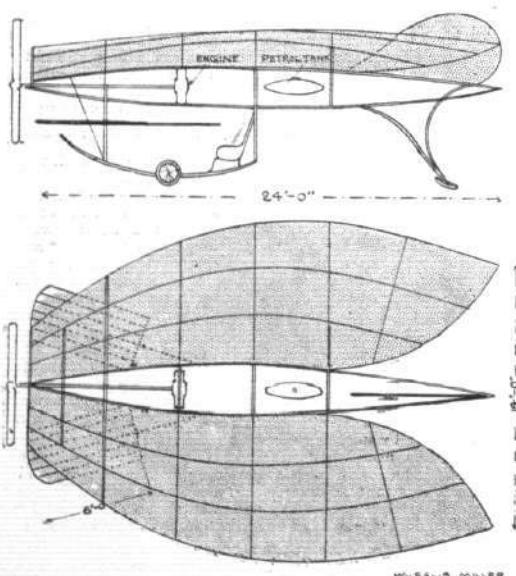
We may add that our machines are all-British, and are able to execute certain evolutions important from a military point of view, and quite unattained by any other types of aeroplanes. On the days following the demonstrations they made numerous lengthy flights, attaining heights of over 2,000 feet, and showing their inherent stability by making complete circuits with both hands of the pilot off the controls and above his head, and this even rivals must admit marks a sensational advance in the factor of stability and safety.

All we ask is a fair field and no favour, and we think that surely even in England itself British enterprise should command that.

T. W. MITCHELL,
Manager, the Aeronautical Syndicate, Ltd.
London Aerodrome, W. Hendon.

Is the Helicopter Possible.

[1178] With reference to the above, and letter 1163 in your issue of May 6th, I do not wish to turn what has been, to me, an instructive correspondence into an argument, especially as I am able



to prove what I said in my letter, having actually constructed a machine, on the lines I mentioned, some years ago.

If Mr. Reynolds will call at my works here, I shall be happy to show him most of the parts which were used in this machine, and which, together with others which I have since used in the construction of my present machine, ornithoplane No. 2, weighed *under* 15 cwt. when complete.

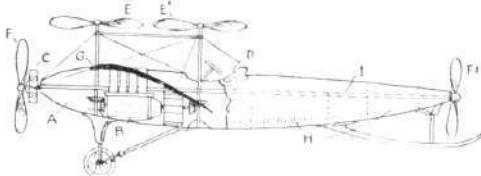
The reason I did not proceed further with the machine was owing to steering and other difficulties, which I could not see my way to surmount at that time.

I had not embodied plane surfaces in the design, and this, as I pointed out in my other letter, appears to be necessary even with a helicopter machine.

Coventry.

W. A. WEAVER.

[The accompanying sketch shows the arrangement of Mr. Weaver's proposed machine. This diagram and explanation should be read with his letter 1,140 on p. 344. A is the hull of aluminium and wood; B, 100-h.p. water-cooled engine; C, 50-h.p. rotary engine; D, pilot's seat and controls; C, C', helical-screws, gear-driven; F, F', tractor and propeller; G, plane surfaces; H, petrol, oil, and water tanks; I, shaft connecting tractor and propeller. All screws to be driven in opposite directions to each other, thus giving the machine gyroscopic stability.—ED.]



oil, and water tanks; I, shaft connecting tractor and propeller. All screws to be driven in opposite directions to each other, thus giving the machine gyroscopic stability.—ED.]

Low-Powered Flight.

[1179] Under the heading of "The Dipping Front Edge," in his letter in your issue of April 22nd, 1911, "Sky Pilot" makes the statement that Mr. A. V. Roe holds the record for flying with low horse-power, *viz.*, 9-h.p.

It may interest him to know that Mr. Sellers, of Kentucky, flies with 4-h.p., and that Mr. Gordon, of California, flies with 5-h.p. Both the above *actually fly*.

Your magazine improves with every issue.

New York.

JOHN GUY GILPATRIC.

"The Gyroscope"

[1180] May I be permitted to point out a slight clerical error in your review of my little book on the Gyroscope in your issue of May 6th. The price of the book should be 15. 6d. and not 3s. 6d. as there stated. Possibly the error has arisen through confusing this book with my book on Model Aeroplaning published by the same firm, and the price of which is 3s. 6d.

Streatham, S.W.

V. E. JOHNSON.

The Gull's Tail.

[1181] Referring to Mr. H. Best's letter [1116] on the subject of the gull's tail, he will, I am sure, pardon me for raising a question on his use of the word "rudimentary" in the following passage. He says: "If the tail spreads first" (*i.e.*, when the bird alters its altitude) "then it does make use of this member. If otherwise, the tail must be out of control and rudimentary."

Now, Mr. Best's use of the word would imply that he considered the gull's tail as being in process of development into a useful member, which is not, I take it, the meaning he wishes to convey.

A suggestion made many years ago by Mr. J. H. Ryder ("Proc. U.S. Mus.," 1886) seems to have established the accepted mode of usage. "Structures which are disappearing should be called *Vestiges*. Structures which are still imperfect but are appearing ought to be called *Rudiments*. As it is, the word *rudiment* is usually misapplied so far as concerns its literal sense when speaking of rudimentary organs."

Permit me to add a word of appreciation for your valuable paper, which is read by many whose studies are concerned with the earth rather than the air.

Muswell Hill.

OSWALD H. EVANS.

MODELS.

Darts.

[1182] Some time ago I was experimenting with the ordinary sort of paper dart, but fitted with an unusually large head (Fig. 1 from above). I also tried fitting it with a paper plane, to try to make it rather more of an aeroplane. And to get an even amount of plane to each side of the body I halved the piece of paper, as in Fig. 2, and inserted it in the middle of the dart. But this middle hole gets deeper towards the back, as is seen from Fig. 3, and my paper went in like Fig. 4, and when folded over came like Fig. 5, almost like the planes of a Dunne biplane.

This piece of paper I intended to be purely for the purpose of sustentation, but when I threw the dart, in the ordinary way, I was much surprised to notice that it was flapping together, and was making a noise. This was entirely unexpected, but I was very pleased, as I found that this flapping increased the stability of my dart, and that it was capable of flying quite fair distances (for a dart). The "wings" were perfectly flat, and there was no wind. It could not have been caused by an air current from beneath, for even when I screened the under side with another plane, held firm and rigid, the "wings" continued to flap when I started the thing off. Can any reader explain this curious phenomenon?

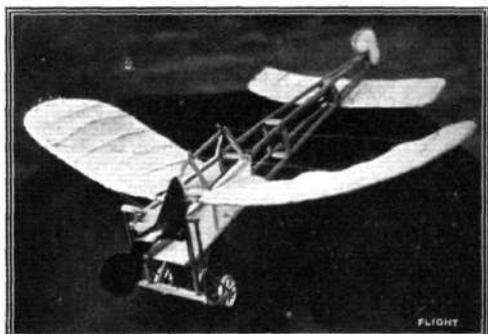
Murrayfield, Midlothian.

JAMES C. S. MACGREGOR.

[The extension planes or flaps are unattached to the body of the flyer, and, therefore, incapable of supporting it. They rise under the air pressure, which would contribute to the support if the planes were attached, and strike together at the end of their motion. In this position the lift vanishes, and they return towards the horizontal again.—ED.]

Model Blériot.

[1183] I am enclosing a photo of a $\frac{1}{2}$ scale model Blériot No. 11 monoplane, which I have made from drawings in a back number of FLIGHT. The wood used for the body, carriage, and tractor is American white wood; most of the joints are glued and



pinned. The plane covering is white mercerised lawn. The tractor was cut from the solid. Both the planes and the tail are detachable. Spring wheels, with the usual sliding collars, &c., are fitted.

C. BRADWELL.

[1184] I am building a model Blériot monoplane, length, 16 ft. ; width, 10 ft. 1. Would skids with aluminium ball-bearing skate wheels do? 2. What thickness and what length elastic is best? 3. What shape and length propeller is best? 4. Would common canvas do?

Stamford Hill, N.

J. E. STUTTER.

[This model is considerably above the average size, and probably involves special difficulties. The questions asked are hardly such as can be answered in an arbitrary way. The wheels depend on the nature of the starting ground. The amount of elastic depends on the design of the model, as also does the propeller. The fabric must be as light as possible.—ED.]

